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# ***JPRS Report***

# **Science & Technology**

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***USSR: Engineering &  
Equipment***

10 AUGUST 1987

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## SCIENCE &amp; TECHNOLOGY

## USSR: ENGINEERING &amp; EQUIPMENT

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**ANALYTICAL REPRESENTATION OF DISCRETELY POINT-BY-POINT DEFINED SURFACES WITH  
IRREGULAR SHAPE FOR COMPUTER-AIDED DESIGN OF TURBOMACHINE BLADES**

Moscow IZVESTIYA VYSSHIKH UCHEBNYKH ZAVEDENIY: MASHINOSTROYENIYE in Russian  
No 2, Feb 87 (manuscript received 2 Sep 86) pp 70-76

[Article by E.A. Manushin, doctor of technical sciences, professor, and  
M.V. Stepanov, engineer]

[Abstract] The principle of analytical representation of a three-dimensional surface and its subsequent synthesis on the basis of given boundary conditions and first derivatives at discrete points, assuming continuous first and second derivatives, is applied to irregular surfaces such as those of turbomachine blades. The method of plane spines in two mutually perpendicular planes is unwieldy and, therefore, another method is proposed for the purpose of computer-aided design. With the surface defined in a three-dimensional system of Cartesian coordinates, the problem of representation is solved in two stages. The first is construction of a family of plane curves forming the surface skeleton, followed by construction of the complete surface. The 8-step procedure involves interpolation, extrapolation, smoothing, reduction to a single scale, and construction of splines in one direction only. The splines are smooth curves, bicubic generalization facilitating construction of smooth spline surfaces. Figures 3; tables 1; references 3: 2 Russian, 1 Western (in Russian translation).

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LOW-ANGLE X-RAY SCATTERING IN  $\text{CaO-SiO}_2\text{-Al}_2\text{O}_3\text{-Fe}_2\text{O}_3$  GLASSES

Alma Ata VESTNIK AKADEMII NAUK KAZAKHSKOI SSR in Russian No 9, Sep 86 pp 67-69

[Article by Zh.T. Suleymenov, candidate of technical sciences]

[Abstract] Four glasses of the  $\text{CaO-SiO}_2\text{-Al}_2\text{O}_3\text{-Fe}_2\text{O}_3$  class (20-27%  $\text{CaO}$ , 47-60%  $\text{SiO}_2$ , 5-18%  $\text{Al}_2\text{O}_3$ , 15%  $\text{Fe}_2\text{O}_3$ ) were examined by the method of low-angle x-ray scattering, this method being very suitable for detection and analysis of submicroscopic structures. At very low scattering angles of 6-20' the existence of many 50-300 Å submicroscopic inhomogeneities was indicated, while an x-ray peak at 20-200' indicated a negligible number in the 15-20 Å range. The scattering intensity was found to decrease with increasing angle in the 6-20' range, but at a different rate in each glass. Calculation of maximum and minimum radii of inertia has revealed that the glass becomes more homogeneous with the difference  $R_{\text{max}} - R_{\text{min}}$  decreasing to 29 Å as the  $\text{Al}_2\text{O}_3$  content is increased to 11 mol.%, and then becomes a bidisperse material as the  $\text{Al}_2\text{O}_3$  content is increased up to 18% mol. This is attributable to a pulling closer of  $\text{Fe}^{3+}$  ions not participating in density fluctuations, and the attendant formation of second-order inhomogeneities. An increase of the  $\text{CaO}$  content was found to enlarge the first-order inhomogeneities without significantly affecting the second-order inhomogeneities. The tendency of  $\text{Fe}^{3+}$  ions and their complexes to pull apart and cause density fluctuations is evidently responsible for the submicroscopic structure in these glasses and can be utilized for controlling it. Figures 1; tables 1; references 3: all Russian.

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MOLDAVIAN PARTY HEADS ASSESS STATUS OF MACHINE BUILDING

Kishinev SOVETSKAYA MOLDAVIYA in Russian No 247 (16005), 21 Oct 86 p 2

[Abstract] The full-page article reports on a conference on ways of improving machine building industry in the Moldavian republic. The conference was called by the Central Committee of the Communist Party of Moldavia. A survey report given by V.F. Semenov, secretary of the central committee, is summarized at length.

Assessing the industry's recent performance, Semenov praised work in robotics at the "Volna" Production Association imeni Chernenko, whose director is V.N. Sosedov. He also praised the work of the "Volna" association's All-Union Scientific Research Institute of Nondestructive Methods and Equipment for Assuring the Quality of Materials, and of the special design bureau of the "Tochlitmash" (precision casting machinery) Production Association in Tiraspol. Nevertheless, Semenov complained about the performance of industry research and design organizations on the whole. He said their work has been unsatisfactory in terms of effectiveness, creativity, and impact on technical standards in industry. Semenov also criticized apathetic official attitudes and lack of coordination, which he said are delaying the introduction of new technology, particularly robots. Introduction of computer-aided design systems is lagging at the "Schetmash" (calculating machinery) Production Association, the "Tekhnologiya" Research-and-Production Association, the "Signal," "Alfa" and "Elektromash" plants, and other enterprises.

Semenov went on to mention forms of cooperation between higher educational institutions, academy of sciences institutes, and industry which have been proposed for advancing technology. For example, the Moldavian Academy of Sciences' Institute of Applied Physics has proposed the creation of an inter-branch scientific-technical complex called "Microopto-electronics and Automated Systems," which would take in two scientific-technical centers. Machine-building plants and institutes and design bureaus belonging to industry ministries would be encouraged to take part in its work. Semenov called upon the republic Council of Ministers to support this proposal. He mentioned also that the republic Party Central Committee has called for the organization of a republic interagency robotics center at the applied-physics institute, but decisions regarding this have been delayed by the republic State Planning Committee.



The discussion of Semenov's report by conference participants also is summarized. D.V. Gitsu, academician-secretary of the Moldavian academy's department of physical-technical and mathematical sciences, spoke on problems of advancing basic research and introducing its results in industry. He reported on progress in creating two interbranch scientific-technical centers called "Electrophysical Methods for Processing Materials" and "Electronics and Automated Systems." Facilities for these centers are being provided by institutes of the Moldavian academy's department of physical-technical and mathematical sciences, and by a number of research-and-production associations and industrial enterprises. A program of cooperation with the USSR Ministry of the Communications Equipment Industry has been drafted in this connection. Gitsu complained that inadequacies of industry research institutes are largely the reason that plants are lagging in introduction of electronic equipment. He called for steps to improve the staffing and equipping of these institutes.

Among the other speakers were A.F. Kokoshko, chief designer of the special design bureau of precision casting at "Tochlitmash," and Doctor of Technical Sciences, Professor I.F. Klistorin, head of a chair of instruction at the Kishinev Polytechnical Institute. Although "Tochlitmash" produces two-thirds of the country's machinery for special casting methods, the majority of these products no longer meets today's requirements, according to Kokoshko. The association is therefore beginning to produce new-generation rotary production lines. Kokoshko said that a single center is needed to coordinate work which individual industry organizations and higher schools are doing on casting-facility development, and that "Tochlitmash" could provide the nucleus for such a center.

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GET ACQUAINTED WITH THE GOLUBEV MACHINE

Minsk NARODNOYE KHOZYAYSTVO BELORUSSII in Russian No 2, Feb 87

[Article by K. Kanus under the "VDNKh BSSR" rubric: "Get Acquainted With the Golubev Machine"; first paragraph, NARODNOYE KHOZYAYSTVO BELORUSSII introduction]

[Text] The Yablochkov spark plug, Mendeleyev table, Matrosov brake, Wankel rotary piston engine--all of these names are familiar to many. And not long ago the State Committee on Inventions and Discoveries registered an invention that, in view of its pioneering nature, was given the name of its author--the Golubev machine.

In a small auditorium at the Minsk Radio Engineering Institute where the invention's author works as a teacher, we are speaking about this original innovation.

"At the basis of its kinematics," says Vladimir Iosifovich "lies a spherical slotted-link mechanism that has not previously been used in creating three-dimensional machines. Imagine a machine housing in the form of a globe within a globe. Between the "globes" there is a movable oscillating tool whose "pole," for example, is moved about the circumference by a single-throw crankshaft. Meridional through cavities are present in the tool. Each is divided into two parts by a piston-connector. There may be from 8 to 12 such cavities or more. The piston-connectors are mounted on axes passing through the "equator" and center of the "globes." When the tool's "pole" moves along the circumference, a change takes place in the volumes of the working chambers formed by the meridional cavities and piston-connectors. Thus, there are from 12 to 24 working chambers in one rotation of the crankshaft.

"What is the effectiveness of such an engineering decision?"

"It makes it possible to catch several rabbits together," says Vladimir Iosifovich, smiling. "First, it is possible to configure the working chambers compactly. Second, the machine attains a high operating uniformity. Third, complete balance is achieved because the position of the machine's center of mass does not change during operation. Fourth, losses due to friction are reduced since the operating processes take place in diametrically opposed working chambers and the pressure forces are mutually compensated. And finally, the

machine doesn't need valves--the motion of the working chambers relative to the channels in the housing walls is used to distribute the working medium.

Vladimir Iosifovich took a miniature "home" model of his machine from a briefcase. What is most unusual here is that the design contains no cylinders and pistons in their traditional, usual form. Nevertheless, they are there. And this is clearly evident when the machine's tool begins moving.

The inventor slowly turns his model's shaft. It is evident how the "sphere" completes a complicated reciprocating, spherical motion and how, at the same time, its "pole" moves along the circumference. During the process of the "sphere's" movement, the cavities configured in it together with their walls and the connectors of the fixed stationary part of the machine (housing) form variable working spaces. If fuel is burned in them, the "sphere" becomes a basic motor vehicle engine for example. And if a torsional moment is applied to the "sphere's" shaft, the machine can be used for other purposes--as a compressor, pump...

"Such machines," continues Vladimir Iosifovich, "may find application in practically all sectors of the national economy and provide a substantial reduction in the overall dimensions and mass of finished products. You might say that a Zhiguley engine could be compressed to about the size of a small watermelon, or a BelAZ engine fits into a "globe" with a diameter of less than a meter. For example, using the machine as a hydraulic engine makes it possible to reduce its mass per unit power 10- to 20-fold.

"In a word, this innovation's range of application may be very wide. The Golubev machine may serve as the basis for creating hydropneumatic engines, various pumps, compressors, and finally, internal combustion engines...These devices are needed in practically all sectors of the national economy.

"An important benefit of the Golubev machine (if one speaks of using it as an internal combustion engine) is that it opens the wide possibility of using cast iron to manufacture basic components since the stresses in the metal are significantly reduced thanks to the spherical shape of the housing components and high uniformity of the torsional moment. The innovation also lacks the crankshaft that is characteristic of multicylinder components. This is the most highly loaded, critical, and expensive component, and manufacturing it costs anywhere from 25 to 30 percent of the cost of an entire piston engine."

Everything is surprising in a Golubev machine. And no less surprising is its inventor. By profession, Vladimir Iosifovich is a radio engineer. Yet he created an invention in the area of machine building.

"A specialist's nontraditional switch from another area of technology sometimes leads to highly effective results. Isn't this so Vladimir Iosifovich?"

"Microwave (SVCh) technology, which is the area in which I work, demands a three-dimensional imagination, for example, to represent complicated structures of an electromagnetic field. A three-dimensional imagination is also necessary to represent the kinematics of so-called three-dimensional

mechanisms, in particular, spherical mechanisms. At the same time, the spatial and functional commonality of all the components constituting a device--integration--is characteristics of many microwave devices. And in the machine, an "integral" tool unifies all the working chambers and power stream, distributes the working medium, and acts as a flywheel...it may be said when applied to mechanics that the machine's ideology reflects the distinctive features of microwave devices--a unification of the individual components into a spatial and functional whole.

"My father's influence is evident in my explorations that are "not according to profile," considers Vladimir Iosifovich. "He can be described as a person with the most diverse knowledge and interests. He was a model maker with the highest qualifications and played the violin. He was an efficiency expert and studied Esperanto. He collected crystal receivers and read "all" of Balzac. He worked with galvanoplastics and made splendid tools--some may be seen in the BSSR State Museum..."

I should add that Vladimir Iosifovich's father was an old Bolshevik and a hereditary worker. He worked in the Minsk Railroad Works and then worked at the October Revolution Plant for many years. He took an active part in the revolutionary movement. A street in the new "southwest" microregion of Minsk was named Golubev.

Vladimir Iosifovich was born in 1936 in Minsk. In 1955 he graduated from secondary school No. 40. From 1955 to 1958 he served in the artillery as a radio specialist. In 1963 he graduated from the Belorussian Polytechnical Institute. He obtained the specialty radio engineer, and he has taught at the Minsk Radio Engineering Institute for more than 20 years.

I saw a working model of the Golubev machine at the Exhibition of Belorussian National Economic Achievements [VDNKh]. It captured the interest of the visitors.

"Now the point is," considers Vladimir Iosifovich, "to move from a working model of the machine to experimental prototypes for different applications. And here the planning organs and directors of the corresponding sectors of the national economy can say that they have really embarked on the path of rebuilding and clearly understand the necessity of searching for and testing new engineering ideas in machine building.



Figure. Working model of the Golubev machine that was demonstrated at the BSSR VDNKh.

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MACHINES FOR CUTTING OUT 50-METER AIRFRAME STRUCTURES

Moscow PRAVDA in Russian No 13 (25000), 13 Jan 87 p 2

[Abstract of article by V. Orlov, correspondent from Ulyanovsk]

[Abstract] The article is a feature-type report on how products and production efficiency have been improved at the Ulyanovsk Production Association for Heavy and Unique Machine Tools (UZTS). The association's general director, A. Martynov, and chief designer, B. Sklyarov, are quoted in the article. The latter said that an orientation on fundamentally new machines was started at the association during the last 5-year plan period. Now its products employ such features as programmable controllers, adaptive control, and robots with numerical-control systems. UZTS' design bureau is said to be the industry's chief group for heavy machine tools and milling machines. They design whole complexes of machine tools, not just individual machines. In the last 5-year plan period, 18 outmoded models of multipurpose machine tools were removed from production and replaced with 17 new, highly automated models. New vertical milling machines with all degrees of automation were put into series production, and the first models of planer-type milling machines with numerical control were manufactured.

One of the association's new machines is said to do the work of an entire machine shop. It is for machining airplane structures of the honeycomb type which can be up to 50 meters long, 2.5 meters wide, and 30 centimeters thick. It is noted that such structures for airplanes before had to be assembled from separate parts. The new machine, which is the first of its kind, will have a moving gantry, with 10 spindles and 21 numerical-control coordinate systems that operate simultaneously, and 10 automatic tool-changing magazines. In the past, with old technology, it is said that it took more than a month to make such an airplane structure, keeping dozens of different machines and workers busy. The new machine by itself can do the work in 5 days. The UZTS association plans to produce 14 of these unique, giant machines in the present 5-year plan period.

Among other new products are machines that use a laser for metal cutting. Robot-equipped aggregates for machining 50-ton ingots are being built. These giant machines, which weigh 1,500 tons, are used in the making of nuclear-reactor vessels and hull sections of icebreakers.

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FLEXIBLE RESETTABLE MACHINING SYSTEM AT MACHINE TOOL PLANT

Kiev PRAVDA UKR'INY in Russian No 24 (13592), 30 Jan 87 p 1

[Article by A. Belous, Odessa]

[Text] This moment had been awaited with great anticipation. The command "Start!" was heard. On instructions from a computer, an automatic warehouse issued a blank. It was conveyed to machining centers, which went into operation at once. After a while, specialists of the Odessa Machine Tool Building Production Association, the Ukrainian Scientific Research Institute of Machine Tools and Tools, and other organizations were congratulating each other on one more success: The quality of machine base members fabricated on this equipment met the requirements of the prescribed program. These specialists are taking part in installing and adjusting this flexible resettable machining section, which is the first of its kind in the oblast.

"The first phase of the system consists of four machining centers from Ivanovo machine tool builders, an automatic warehouse, conveyers and lifts, and a number of computers which control production processes," related N.I. Reshetnev, director of the machine tool institute. "When it reaches full capacity, it will be an entire shop tended by 13 persons. I might note, for purposes of comparison, that it would take 80 machine operators and 22 machine tools to handle the same volume of output with conventional technology. Two more flexible resettable production lines will be put into operation at the association, on the basis of which it will be possible to begin producing flexible resettable systems bearing the Odessa trademark."

A new system of production organization has been introduced at the association in connection with the startup of the flexible resettable system. It is a so-called production-team complex which unites three shifts of engineers and workers. Incidentally, all of the members of such a complex work on a single order and bear collective responsibility for the quality of the work.

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**ANALYTICAL METHOD OF SELECTING MATERIALS IN MACHINE BUILDING**

**Moscow IZVESTIYA VYSSHIKH UCHEBNYKH ZAVEDENIY: MASHINOSTROYENIYE in Russian**  
No 2, Feb 87 (manuscript received 19 Jun 86) pp 99-102

[Article by O.Kh. Alaferdov, candidate of technical sciences, docent, and  
Ye.O. Gabrielyan, engineer]

[Abstract] An analytical method of selecting technological materials is proposed which considers not only quantifiable criteria such as mechanical strength and wear resistance but also qualitative ones such as machinability, brittleness, deformation and grain growth during heat treatment. The stepwise procedure begins with identification of all materials meeting a few distinct criteria. The next step is selection of the preferable grade of each material. Subsequent multicriterial optimization of the selection is based on weighting each criterion and absolute as well as relative prioritization of all competing materials. The procedure is demonstrated on selection of the best steel for a rough-cutting and fine-cutting tool. Calculations using the contiguity matrix with recommended preference indexes depending on the variability of criteria yield the material with the largest composite priority index. The algorithms of this procedure are easily programmable on a computer. Figures 1; tables 2; references 5: all Russian.

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STANDARDIZATION OF BASIC WATER-POWER EQUIPMENT FOR HYDROELECTRIC POWER PLANTS

Moscow ENERGO MASHINOSTROYENIYE in Russian No 1, Jan 87 pp 38-39

[Article by V.I. Platov, engineer, and V.D. Trampolskiy, candidate of technical sciences]

[Abstract] Turbine and generators for hydroelectric power plants are being standardized by Gidroyekt [the All-Union Planning, Surveying, and Scientific Research Institute of Hydraulic Engineering Structures] into models and sizes according to nominal and maximum head ratings as well as nominal unit power. Total plant capacity and the number of turbine-generator sets installed to meet it are taken into consideration. Models and sizes are selected on the basis of cost analysis and optimization, using data on 13 hydroelectric power plants already in operation for proposed standardization in 8 more. Tables 1.

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STATE OF ART IN POWER STEAM-TURBINE SETS AND AVAILABLE MARGIN FOR IMPROVING THEIR ECONOMIC INDICATORS

Moscow ENERGO MASHINOSTROYENIYE in Russian No 12, Dec 86 pp 5-8

[Article by L.P. Safonov, doctor of technical sciences, G.V. Zhukovskiy, candidate of technical sciences, V.B. Sandovskiy, candidate of technical sciences, Yu.A. Marchenko, engineer, and Ye.V. Simdyanov, engineer]

[Abstract] Significant progress has been made by the Central Institute of Boilers and Turbines jointly with turbine manufacturing enterprises in improving the construction of power steam turbines for more economical operation in atomic and thermal electric power plants. The critical factors contributing to this are better aerodynamic design of all flow channels, main channel as well as condensers, heat exchangers, and startup-shutdown apparatus, better design procedures adapted to latest developments in electrical power engineering, better technical level of turbine operation and maintenance, automation, and trouble shooting. The attainable efficiency of



stages is known to decrease as their nominal design pressure increases, but efficiencies approaching or exceeding 90% have already been attained in operation of high-pressure (6-10 MPa) stages while the efficiency of low-pressure (0.1-1.0 MPa) stages already reaches 94%. Considering that specific existing designs are not always optimal in every respect, there remains a margin for optimization. Computer-aided design offers an excellent practical tool for optimization, whether on the basis of most precise mathematical models and theoretical analysis or on the basis of target-oriented engineering methods. Data on K-1000-60/3000 turbines illustrate these possibilities. Experimental studies have also been made for improvement of TK-450/500 turbines.

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#### EFFECT OF CLIMATIC INFLUENCING FACTORS ON ALIGNMENT ACCURACY OF COMPOUND REFLECTING SURFACES

Ashkhabad IZVESTIYA AKADEMII NAUK TURKMENSKOY SSR: SERIYA FIZIKO-TEKHNICHESKIKH, KHIMICHESKIKH I GEOLOGICHESKIKH NAUK in Russian No 5, Sep-Oct 86 (manuscript received 10 Nov 84) pp 20-28

[Article by M.A. Gurbanyazov, V.I. Yeremeyev and V.G. Fokin, Scientific-Industrial Association 'Solntse' (Sun), TuSSR Academy of Sciences]

[Abstract] The effect of ambient temperature changes on the alignment accuracy of compound reflecting surfaces is analyzed, a typical such surface being that of a reflector which consists of facets assembled relative to reference markers on them in accordance with theoretical coordinates. The distances between reference markers for each facet are obviously known and the distances between reference markers for facets in adjacent strips are monitored during assembly. Deviations of coordinates from the theoretical ones and displacements normal to a surface caused by thermal expansion as a result of temperature changes, in addition to technological surface imprecision and assembly errors, are calculated for the worst case. An empirical statistically normal coefficient is introduced which characterizes the compliance of frame and facet contacts so that, on the basis of experimental data and appropriate measurements, the clearances necessary for avoiding interference and overstress can be determined. It is taken under consideration that, while the ambient temperature depending on the climate can vary from  $-40^{\circ}\text{C}$  to  $+40^{\circ}\text{C}$ , installation of reflectors is feasible only at temperatures from  $-5^{\circ}\text{C}$  to  $+40^{\circ}\text{C}$ . Figures 3; tables 1; references 3: all Russian.

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CSO: 1861/150

## ENERGY CHARACTERISTICS OF PUMPING STATIONS WITH TOTALLY ENCLOSED SETS OPERATING IN WATER-STORAGE MODE

Minsk IZVESTIYA VYSSHIKH UCHEBNYKH ZAVEDENIY: ENERGETIKA in Russian No 1,  
Jan 87 pp 93-96

[Article by V.I. Vissarionov, doctor of technical sciences, professor,  
V.V. Yelistratov, candidate of technical sciences, and M.M. Mukhammadiyev,  
engineer, 'Order of Lenin' Leningrad Polytechnic Institute imeni M.I. Kalinin]

[Abstract] The energy characteristics of low-head pumping stations with totally enclosed (in "bulbs") horizontal reversible pump-turbine sets operating in pumped-storage electric power plants are analyzed on the basis of a model experiment. The model machine has a runner  $D_1 = 0.35$  m in diameter with 12 blades, an overall length  $L_a = 9.56D_1$ , an overall width  $B_a = 2.0D_1$ , and an  $L_0 = 4.5D_1$  long discharge tube. Performance calculations are based on applicable hydrodynamic relations and experimental data, with the blade angle set at  $0, \pm 3^\circ, -6^\circ$ , and the nozzle blading angle varied over the  $40-72^\circ$  range for each blade setting. With the Reynolds number higher than  $2.5 \cdot 10^5$ , the flow is assumed to satisfy conditions of dynamic similarity and thus ensure validity of the model tests. Performance curves plotted in terms of efficiency as a function of the flow rate and of the blade setting angle, with the machine driven as a pump at constant speed of 500 rpm and running as a turbine at a speed variable over the 300-600 rpm range, indicate maximum efficiency of 86.2% and 81.4% are attainable in the respective modes of operation. Figures 3; references 5: 4 Russian, 1 Czechoslovak.

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UDC 621.1.013

DEPENDENCE OF STEAM DISTRIBUTION ON DESIGN OF IMMERSED PERFORATED PLATE

Moscow ENERGOMASHINOSTROYENIYE in Russian No 1, Jan 87 pp 15-18

[Article by Ye.P. Svistunov, candidate of technical sciences, and G.A. Tarankov, engineer]

[Abstract] A model study of horizontal steam generators with perforated separator plate immersed above the tube bundle was made at the "Gidropress" Experimental Design Office jointly with VNIAM [the All-Union Scientific Research Institute of Atomic Power Machinery] for the purpose of determining the effect of such a plate on the water-steam hydrodynamics and the steam distribution on its design and location. Seven models were tested, using plates with different perforation patterns and placing them within various flow zones above the tube bundle. The results indicate the feasibility of equalizing the steam load on the evaporation surface, for the purpose of which such a separator is installed, and of optimizing the effectiveness of this device by design. The authors thank S.A. Logvinov, A.I. Dmitriyev, V.P. Sevastyanov, and V.M. Kryukov for participation in performance of tests. Figures 4; references 7: all Russian.

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UDC 621.311.25:621.039

DESIGN OPTIMIZATION OF STEAM PIPING FOR WET-STEAM POWER TURBINES

Moscow ENERGOMASHINOSTROYENIYE in Russian No 1, Jan 87 pp 12-14

[Article by V.Ya. Stanislavskiy, candidate of technical sciences, A.A. Palagin, candidate of technical sciences, and B.S. Ilchenko, engineer]

[Abstract] A method of optimizing the design of steam pipes for wet-steam power turbines has been developed jointly by the Institute of Problems in Machine Design (UkSSR Academy of Sciences) and the Industrial Association "Turboatom" (Turbines for Nuclear Power Plants). Its object is to minimize the metal content and the heat loss. It is based on a mathematical model which describes steam flow and heat transfer according to Kirchhoff's first

and second laws. Solution of the corresponding system of three equations yields the optimum steam velocity for which the piping should be designed. The algorithms are programmable for a computer. Numerical data and a schematic piping layout for a K-1000-60/1500 turbine are shown, based on a steam velocity within the 40-50 m/s range as technically and economically optimum at the nominal 1000 MW power level. Figures 2; tables 1; references 3: all Russian.

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# **EXCESSIVE STRUCTURAL UNIFORMITY OF AES CRITICIZED**

Moscow STROITELNAYA GAZETA in Russian 9 Apr 87 p 3

[Article by Yu. Demyur, architect]

[Text] The valid use of standardized elements, industrial products and standard designs in construction undoubtedly has a positive effect. But there are examples of thoughtless pursuit of uniform "standardization," which discredits a good idea.

Even when the development of serial AES [nuclear power plant] was still being planned, it was proposed that the architects of the ministry's scientific-technical council conduct a thorough investigation of a typical station plan. The fact is that the scientific and technical council has mainly considered projects over the last few years, which are already in the stage of construction when the recommendations of the architect specialists can essentially change nothing. And even worse things happen: finished objects are considered.

Additionally, Atomteploelektrouproyekt found out how to bypass the investigation entirely under different pretexts. A number of nuclear power plants are now being constructed according to standard designs not only of separate buildings and structures, but according to a "standard general plan" as well.

Moreover, standard designs of even separate buildings must be used on a very differentiated basis within the nuclear power plant complex. After all, the operating personnel must work under completely different conditions.

The appearance of any standard general plan generally causes doubts. As is known, a general plan should take into account the relief, orientation of the buildings not only with respect to the directions of light but also with respect to the location of reservoirs, spur tracks, the directions of overhead power transmission lines, its relation to population centers, environmental protection, prevailing winds and so on. Strictly speaking, standardization is generally excluded.

That is why serial nuclear power plants must be considered with all seriousness from the architect's viewpoint and qualified conclusions must be made and corrections must be introduced on their basis. There will be much benefit from this.

The "standard general plan" of a nuclear power plant is a sad picture. Who would now think of building barns, garbage dumps, boiler plants and similar structures along the street frontage and then high residential and public structures behind them, as is done in the "standard general plan"? The facade of the plants is covered by secondary and even tertiary objects, such as waste dumps, machine shops and boiler plants. And the entrance to the nuclear power plant during the fall-winter season will be covered by a thick haze from the sprinkler ponds.

The "standard general plan" arbitrarily rotates on different sites around the central axis of the nuclear power plant territory. Therefore, the facade of the plant at the Rostov Nuclear Power Plant is oriented to the southeast, while that of the Bashkir Nuclear Power Plant is oriented toward the northwest. The prevailing winds at the Bashkir Nuclear Power Plant blow from the direction of Agidel settlement toward the plant, while those at the Rostov Nuclear Power Plant blow in the direction of the nearest large population center--Volgodansk. The typical flues, like those at GRES [state regional power plant] or TETs [central heating and power plant], are installed instead of ventilation stacks. The connections between separate buildings are poor--the selected evacuation routes of personnel appear unintelligible, the type of administrative-management buildings, the medical building, food unit and so on--are poor.

One of the main factors for the low quality of architectural decisions in industrial construction is related to the fact that the last word always remains with the planning organizations and their departments. The technicians play the main role in these decisions. The architects (if at all) are invited in only during the final phases of the work, when all the fundamental design problems have essentially been solved, and they are left only with "touch-up" and "painting" already completed designs and structures. But the architect is obligated to actively influence primarily the creation of the most favorable working, service and recreation conditions.

Intersector examinations of the architectural decisions of industrial objects are necessary and new approaches to this matter are required. Highly skilled chief architects of cities, designers, and Gosgrazhdastroy [State Committee for Civil Construction and Architecture] should confirm the principal questions of industrial architecture. Industrial architecture should be public. And the USSR Union of Architects should be concerned about this.

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CSO: 1861/190

# OPERATING PROBLEMS OF MAIN CIRCULATION LOOP OF NUCLEAR POWER PLANTS

Moscow ENERGETIK in Russian No 2, Feb 87 pp 8-9

[Article by M. G. Khomich, engineer, and V. F. Pogorelyy, engineer, Southern Ukraine Nuclear Power Plant]

[Text] Increasing the operating reliability of nuclear power plant equipment and more efficient use of installed capacities depend to a significant degree on the quality of construction, installation and startup procedures. Equipment failures that occur during operation are largely dependent on the quality of production assembly, subsequent checking at the manufacturing plant and directly at the power plant during the final installation stage. Reliable operation of the main circulation loop (GTaK) is primarily dependent on long-term uninterrupted functioning of the main circulating pumps (GTaN) and the support systems (oil system, intermediate loop and so on).

A VVER-1000 reactor with four main circulating pumps in the seismically stable version of type GTaN-195M has been installed in the pilot power-generating unit of the Southern Ukraine Nuclear Power Plant. It was necessary during startup procedures and subsequent operations to reduce the vibration of these pumps.

The technique of final plant assembly of the channeled part of the main circulating pumps does not permit one to determine the specific limits of the possible residual play of the rotor. Dynamic balancing on the plant bench does not eliminate residual play even at minimum amplitudes, corresponding to the permissible vibration levels.

The rotor is balanced horizontally on the bench under plant conditions of balancing. Shaft necks of the oil and graphite-teflon bearing guides are used as the supports of the pump rotor. Under real conditions, the bearing guides of a rotor mounted vertically are essentially not subject to the natural force of gravity and, accordingly, the vibrational state of the turning rotor should be determined only by the precision of its assembly, by the clearances in the bearings and between the diffuser and rotor. In practice, cases of intensive wear of the graphite-teflon bearing were observed upon inspection of the channeled part of the main circulating pump. The possible causes of this phenomenon were analyzed at the power plant.

One-sided wear of the graphite-teflon bearing was noted during plant bench tests. Phenomena that indicate displacement of the rotor axis with respect to the axis of the graphite-teflon bearing possibly occurred even during the bench tests.

A uniform water layer, which performs the role of an additional bearing guide, is formed in the annular gap 2 mm wide between the rotor rim and pump diffuser during rotation. The rotational axis is shifted with respect to the rotor axis upon wobbling of the rotor, contributing to separation of the resulting hydrostatic water wedge in the graphite-teflon bearing.

Analysis of the vibrational characteristics revealed low-frequency harmonics in the vibrational frequency spectrum of the main thrust bearing (GUP), which may have occurred due to the perturbing forces upon separation of the wedge in the graphite-teflon bearing. An additional factor that causes displacement of the rotational axis of the rotor with respect to the axis of the bushings may be disturbance of the diffuser setting with respect to the axis of the seat bore of the snail housing during assembly operations.

A special accessory was fabricated to check the correctness of installation of the diffuser (Figure 1). A pipe 2, welded to a plate with stiffening ribs 5, is inserted into the opening of the support plate 1. The length of the plate is 4-5 mm less than the diameter D of the channeled part. Teflon plates 7 are glued to the plate after final machining to protect the seating bore in the snail for the channeled part when the plate moves along the bore. The plates are 2-2.2 mm thick as a function of the tolerance for their length. The bores of the diameters along the planes A and B are made during one pass on a lathe.

A collar 3 with adjusting screws for installation of clock-type indicators 6 is placed on the bored surface B. Final attachment of the indicators is possible both before installation of the accessory and locally after the corresponding measurements. The system is rotated by a steering wheel 4, the readings of the indicators are recorded at each point where the circumference is marked and the extent of the possible displacement of the diffuser with respect to the seating position in the snail housing is read.

Radial forces act on the rotor during operation of rotary pumps, due to which the shaft is shifted to the side, which also causes premature one-sided wear of the graphite-teflon bearing. The appearance of radial forces is related to the constant pressure along the perimeter of the offset coil and in some cases is related to nonuniform speeds around the perimeter of the rotor due to asymmetry of supply.

Cases of an increase of the vibrational level of the top crosshead of the drive rotor to 200  $\mu\text{m}$  with a normal value of 100  $\mu\text{m}$ , of the housing of the main thrust bearing to 100  $\mu\text{m}$  (the value has not been standardized) and of the drive column of the main cutoff valve (GZZ) to 600  $\mu\text{m}$  (the value has also not been standardized) were observed during operation of the main circulating pumps and during startup procedures.



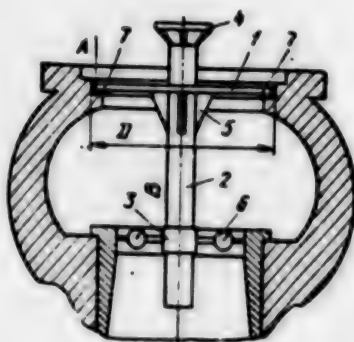


Figure 1. Accessory for Checking Position of Diffuser with Respect to Axis of Packing Bore of Snail Housing

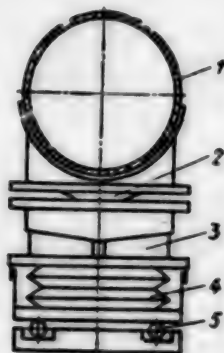


Figure 2. Additional Movable Support: 1—main circulating pipeline; 2—spherical bearing; 3—wedge jack; 4—disk spring; 5—spherical bearing

The bearings of the drive motor rotor were balanced dynamically to reduce vibrations of the assembly. This made it possible to reduce within the shortest time the level of vibration to the minimum possible values (10-40  $\mu\text{m}$ ), but did not eliminate a gradual increase of it to values twice greater than the permissible values.

In considering the main circulating pump as a structural element of the main circulation loop, it should be noted that latent defects may occur during installation. The technique of installation welding of the main circulation loops and final adjustment of the main circulating pumps on the bearings assumes observance of rigid requirements of horizontal connection of the snail and vertical connection of the axis of the assembly. At the same time, the possibility of violation of tolerance during installation and assembly to coaxiality of the welded pipe unions of the main circulation loop is not excluded.



"Damage" to the bearing lugs of the main circulating pumps during warm-up of the loop was determined during startup procedures and subsequent development of the power-generating unit. This was most frequently observed to a greater or lesser extent on the bearing lug, separated by the maximum distance from the reactor (closer to the reactor compartment containment). The "damage" was detected when measuring the vibration of the elements of the main circulation loop and the main circulating pumps and the vibrational amplitudes at the points on the drive motor, the maximum distance from the bearings, reached 150  $\mu\text{m}$ . The difference in amplitudes along the lug and on the surface under it was 20-40  $\mu\text{m}$ . The measurements were made with BIP-5 and BIP-7 balance beam-research instruments.

A check of the uniformity of loading the bearing lugs of the main circulating pumps (two of three bearings) was made on a cooled loop during one of the shut-downs. It was assumed that the reaction of each of the bearings should be approximately 50 tons at total mass of the assembly of 150 tons. Thus, "wear" of the bearings should occur with uniform loading of the support lugs when an upward force of approximately 50 tons is applied in the lug. The moment of "wear" and the "damage" force of each bearing were monitored by the clock-type indicators installed on each lug.

It was established upon analysis of the data that a force of 50 tons on the bearing, most separated from the reactor, is possible only with a rise of it by 1.9 mm, while that on the heat exchanger bearing is possible with a rise of 0.25 mm.

Operations to change the height of the spacers under the bearings with the adjusting screws and to load the bearings must be carried out to equalize the loads on them.

The design of the adjusting screws is built into the bearing and permits the necessary correction of the load in a small range with redistribution of the reactions, which is also carried out on the assemblies within tolerance. A significant disadvantage of these operations was variation (within tolerance) of the horizontal and vertical position of the assembly. This variation can be taken into account only by calculation, since there are no special marked surfaces on the assembly for checking the variation of the bevel by using the Geologorazvedka [geological prospecting] level.

It was already noted that the total force of the effective loads in the main circulating pump-pipelines of the main circulation loop system is shifted somewhat toward the reactor with respect to the rotational axis of the rotors of the main circulating pumps. One of the methods that eliminate nonuniform redistribution of loads along the bearings of the main circulating pumps is possibly lengthening the arms of two bearings toward the reactor. Moreover, uniform load distribution along the bearings can be achieved by increasing the load on the bearing most distant from the reactor. These proposals require the corresponding additional calculations and experiments on the basis of statistical data for nuclear power plants.

Additional moveable bearings were installed as an experiment under the pressure loops from the main circulating pumps to the reactor in the power-generating unit of station number 1 to improve the load distribution along the bearings (Figure 2). The bearings were developed, installed and put into operation at the nuclear power plant upon coordination with the planning organization. An optimal version of the degree of relief of the loop for a specific main circulating pump was selected which made it possible to reduce the vibrational level at the check points of the assembly by a factor of 2. Moreover, it was possible to reduce considerably the effect of "wear" of the bearing of the main circulating pump most distant from the reactor according to data of the loop vibration characteristics.

Modern methods of operational monitoring of main circulating pumps are based on remote measurement of the main parameters (flow characteristics, pressure drops and vibrational check).

Apparatus for remote monitoring of the vibrational level of main circulating pumps has a number of disadvantages: frequent failure of the secondary instrument modules, sensors and transducers, violation of the soldering points to the sensors and so on. The vibrational state of the main circulating pumps is analyzed in this regard on the basis of received data during measurement by portable vibration-measuring apparatus (with regard to radiation safety of maintenance personnel). This form of monitoring helped to determine on time the early breakdown of the graphite-teflon bearing of one of the main circulating pumps.

Thus, provision of vibrational reliability requires development of a special method and of special measuring devices, specifically, of high-quality instruments for diagnostic vibrational checking.

On the whole, the effect of different dynamic forces eventually results in an increase of vibration of the drive motor housing, of the main thrust bearing and of the coil. These vibrations are in turn excited in the pipelines of the main circulation loop as well, gradually attenuating near the reactor vessel.

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CSO: 1861/169

INTRODUCTION OF STATE ACCEPTANCE SERVICE IN CHERNOZEM AREA

Moscow EKONOMICHESKAYA GAZETA in Russian No 52, Dec 86 pp 8

[Article by P. Gurov, director of the Central Chernozem Center for Standardization Metrology, V. Zhuravlev, journalist, and N. Kozlov, special correspondent, Voronezh]

[Text] The sociologists do not say for nothing: "The longer the time problems of quality occupy the schedule of the director's day, the higher quality the products that come from the factory gates."

Introduction of State acceptance at 13 Voronezh enterprises made it possible to evaluate objectively the work under the new conditions. What were these evaluations?

"It is far from clear," says the senior manager of the state acceptance service for Voronezh Oblast V. Mikhaylov. "To ascertain this, it is sufficient to analyze the activity of our service at different enterprises."

Here is a column of numbers that characterize the work of the Association Rudgornash. In November 1986, the manufacturers of mining equipment were supposed to present according to plan half of the their products to representatives of nondepartmental control. They presented somewhat fewer--38 percent. The quality of the drilling rigs, loading-delivery machines, self-propelled rail cars and other equipment were unquestioned. A total of 95 percent of products were turned over from the first presentation. The indicators in December were even higher.

Due to which measures of the administration of the Production Association Rudgornash was possible to make process of a "visa" of the State Acceptance Service at the enterprise essentially painless? Preparation to working under the new conditions were begun as early as June. An order was published throughout the association and the measures required to implement it were worked out: correction of the design-production documentation according to the State Standards and manufacture of missing rigging and test benches. Political and educational work to restructure thinking was of course placed first.

The picture was different at the Machine Building Plant imeni V. I. Lenin (the director is V. Rasner). Products worth 404,000 rubles were supposed to be

presented through nondepartmental control during the month according to the plan. They offered products worth 74,000 rubles, and this was not the main production, but only goods in wide demand. And what happened? A small part of the products with a total cost of 260 rubles successfully went through control from the entire lot that was made available to the representatives of the State Acceptance Service.

Matters became even worse during the first 10 days of December. The plant workers left the nondepartmental control "without work," without having presented a single product. And this despite the fact that the machine builders were obligated to present to the State Acceptance Service products with a total cost of more than 2,000,000 rubles during the last month of the year. It turns out that the plant is completely unprepared to work according to the new system. This is an alarming fact.

The workers of the new service must encounter problems which did not occur under the previous conditions at the enterprise. This is natural. After all, no one was seriously involved in quality control. The most important indicator of the economic help of production was not rigidly planned and, accordingly, was not checked. This is what the manager of the State Acceptance Service I. Gorshkov told us at the Production Association Voronezhzernomash:

"Many workers, engineers and managers of shops and services are not actually ready for strict quality sampling measures. It is felt for this reason that the pilot plant of the association presented us with considerably fewer machines than planned during both November and December."

Another problem is the condescending attitude toward "details," sanctioned from above. Here is an example.

PF-133 enamel is used to paint grain-cleaning machines, but a different material is required according to technical conditions. The State Acceptance Service has warned the plant director about this nonconformity. But he in answer announced "indulgence for rejection." One can only interpret the letter of the Main Administration for Supply and Sales of Chemical Products of Soyuzglavkhim attached to USSR Gosnab, signed by chief V. Smirnov. The text of the letter is rather eloquent: "It is impossible to allocate AS-182 or PF-188 enamel in place of PF-133 enamel due to the status of resources. In this regard, paint the agricultural machinery, as before, with PF-133 enamel."

Another words, let the client's headache for inferior quality painting (which leads to premature failure of the machines due to rust)!

"This is not so," I. Gorshkov disagrees, "our head does not ache for output of a low-quality product and we will solve the 'enamel problem.' How? I do not know yet. I am firmly confident only that the service life of the grain-cleaning machines should be extended."

Introduction of a State Acceptance Service at the plants and associations of Voronezh increased production discipline and production skills and activated the



departments of technical control. We observed these characteristic features of restructuring at many enterprises of the city. But as we can see, much still remains to be done.

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CSO: 8144/3569

STATE ACCEPTANCE: QUALITY, RHYTHM, DISCIPLINE

Moscow EKONOMICHESKAYA GAZETA in Russian No 1, Jan 87 p 8-9

[Interview with Filipp Vasilyevich Popov, first secretary of the CPSU District Committee by N. Manuylov; first paragraph is introduction]

[Text] The results of preparatory work of the industrial enterprise to convert to state acceptance of products were summarized at a meeting of the bureau of the Altay CPSU District Committee. After the meeting, our correspondent in Manuylov talked with Filipp Vasilyevich Popov, first secretary of the CPSU District Committee.

[Question] Filipp Vasilyevich. It was easy to note at the bureau meeting that analysis of the work to convert to state acceptance was multiaspect in nature. What determined this approach to the problem.

[Answer] Problems of State acceptance are specific and new to primary party organizations and to specialists and managers of enterprises and associations. Therefore, we tried to consider them in different aspects.

Speaking descriptively, State acceptance is a protector of the interests of the State and of enterprise collectives against rejected products. Introduction of it is a logical development of the struggle which our party is waging purposefully to improve product quality and to improve the technical level of products.

As M. S. Gorbachev emphasized at a meeting of the CPSU Central Committee on problems of State acceptance, the struggle for quality is one for efficiency of social labor and for satisfying more completely the growing needs of the Soviet people. And these are not only economic, but also political problems.

Universal analysis of the technical level of production and of labor and production discipline was begun in the district party organization immediately after publication of the decree of the CPSU Central Committee and the USSR Council of Ministers "On measures for fundamental improvement of product quality." In June 1986, we considered and approved measures at a meeting of the bureau to eliminate determined deficiencies. The council on effects of

scientific and technical progress attached to the district committee is completing development of the district "Quality" program. Municipal, rayon and plant party committees and our most active party-economic and ideological workers are constantly engaged in these questions.

We follow with special care the technical level of machine-building products, including agriculture machinery, which is represented in the kray by large enterprises of Minselkhozmasht SSSR [Ministry of Tractor and Agriculture Machine Building] with annual volume that exceeds 1 billion rubles. A special conference of the machine builders of the kray was held in October. An important principle conversation was convened on affairs in this most important sector. A party analysis of what is occurring was given at this conference. It helped the managers and specialists to see that many of the most important types of products, which were regarded as good, lag considerably behind the requirements of time with respect to specific metal consumption, consumption of fuels and lubricants, power, reliability and other characteristics, that are unable to compete with the products of foreign companies.

I have named only some aspects of an integrated approach to problems of product quality. We are also approaching state acceptance from these positions, understanding that this is an essentially new phase which forces us to act more decisively not only in organization of it itself, but in many other directions. Problems of technical retooling, production rhythm, organization and payment for labor, rates of growth of social production and all the educational work among the labor collectives are directly "formed" around it.

[Question] The evaluation of the bureau was clear: the preparatory work to State acceptance at the enterprises of the kray, could not be regarded as satisfactory at all of them. What did these conclusions indicate.

[Answer] Before answering this question, I would like to explain: the most important product consumed by the leading sectors of the country's national economy--power boilers, railroad freight cars, gas-welding and plasma sputtering equipment and tractor engines, will go through State acceptance. The volume of its production, if one estimates in rubles, exceeds 700 million rubles and more than 42,000 persons are engaged in output of it. Moreover, some enterprises among these must assimilate the output of completely new products from the first days of 1987. Thus, the Production Association Sibenergomasht will soon begin to manufacture a power boiler with high-capacity fluidized-bed burner. Production of these boilers will be developed for the first time in Soviet and worldwide practice.

One cannot help but note that a different approach to problems of State acceptance is being reviewed at many levels--managers and specialists of enterprises, party committees, economic services and even the new organizations that have just been created. And one must say directly that the attitude of the party committees and their active or passive position are largely reflected here.

At the largest enterprise--the Altai Rail Car Building Plant, for example, the party committee (the secretary is A. Shatokhin) and the board of directors (the

director is Ye. Dubovtsev and the chief engineer is V. Zamuruyev) selected both a correct tactic and strategy. Having begun to prepare as early as June, they scrupulously and attentively began to analyze all versions of the consequences of making the estimates of product quality more rigid. Extensive organizational and educational work of the most active party workers began with a clear schedule (and it was necessary in October to present for turnover 30 percent of products according to the new system 50 percent in November and 75 percent in December). Just as important was the fact that the party committee recommended the best specialists--communists to staff the new organization and chief designer Viktor Nikolayevich Timofeyev, who has worked at the plant for 25 years, became head of it. But even the first stiff steps of the State Acceptance Service (almost all products presented to the State Acceptance Service in October was not accepted) did not raise doubts and confusion here. On the contrary, the collective was mobilized even further, understanding that the State Acceptance Service is not a threatening sword, but is primarily an assistant in the efforts of the collective--from the worker to the director.

They conscientiously began to make the acceptance conditions more rigid in October-November and placed all production under these conditions at the Biysk Boiler Plant of Minenergomash SSSR (USSR Ministry of Power Machine Building) and waged a noncompromising struggle toward product output corresponding to State Standards. They did not get by without known losses--the November plan was not fulfilled. The collective painfully tolerated this, but with a benefit: the situation stabilized, quality improved sharply and by January they had, so to speak, become fully armed.

A lot was done in the collectives of the Altay Tractor Electrical Equipment Plant (Rubtovsk, of the Production Association Sibenergomash). True, this was discussed modestly at the bureau meeting. We know their experience and their problems and it was felt premature to place emphasis on success.

We approached the analysis of the state of affairs at such enterprises as the Altay Motor Building Production Association and the Barnaul Hardware Machine Plant very critically at that time. Why? Primarily because they approached the State Acceptance Service with old criteria and estimates, hoping unknowingly that the entire combination of organizational-technical and education measures would be extended and that time would be lost.

And this was under conditions when a mass of unresolved problems had accumulated at the same motor building association. Almost one-third of the test benches are inoperable here and the time of running-in the engines has been reduced to 20 minutes. It seemed as if they earlier did not know and did not see that they have obsolete equipment in the shops, on which one cannot achieve the required quality. However, more than 30 of the planned measures on preparation for acceptance were interrupted. And, having begun test State acceptance, they immediately encountered the circumstance: 30 percent of the products were rejected even from those selectively presented. Moreover, it is typical that 60 percent of the rejects were because of negligence, laxity and low discipline, while 40 percent of the rejects falls into the need to solve engineering and technological problems in production.



Unfortunately, it turned out that there is no clear position in the created State acceptance organization with respect to organization of control at the design-planning level. And the association must not only increase sharply the quality of manufactured motors, but must also solve an extremely important problem--develop a new engine for a completely new type of T-250 agricultural tractor, manufacture of which will be developed in the kray.

In short, if one regards preparation for State acceptance as combat reconnaissance, this reconnaissance is not completed in time. And the explanations to the office of the general director of the association M. Voronin, of the secretary of the party committee A. Grebennikov and of the manager of the State Acceptance Service V. Vakhlov has not yet convinced anyone completely that the "battle" itself will be won after the first of January and that the collective will not permit interruptions of deliveries.

We seriously corrected the director of the Barnaul Hardware Machine Plant Rakhmanov and the manager of the State Acceptance Service V. Vorotnyka. Instead of becoming prepared in all directions, what occurred for which M. S. Gorbachev reproached them at the November meeting at the CPSU Central Committee: without having succeeded, some State acceptance organizations wallowed in bureaucratism and red tape. The expensive time of preparation largely "ate up" the explanations of rank status and determinations of who is most important among them. And moreover, the procedures of the state acceptance were defined with a delay and control tests of products remain unsupported and the measures planned for the preparation period are not being fulfilled. As a result, the first attempts to check the requirements of the state acceptance service only began in December.

I am talking about this in more detail deliberately. One could say formally: we have analyzed the situation, made a decision and what now? What must be done? But we are talking only about the first steps and the lessons which the State Acceptance Service have already taught are lessons for tomorrow for party committees, for the most active party workers and for specialists of those enterprises which will follow this path.

[Question] Can you name the main problems which the preparatory period has revealed.

[Answer] I can and I should. I have already named some of them, but there are others as well. These are primarily problems of technical retooling. The workers began to literally count on their fingers worn-out machine tools and the imperfection of measuring tools and instruments. Problems of input and control and relationships with the suppliers of makeup products have been aggravated. There are unresolved problems in certification of workstations, in incentives and evaluations of the quality of the workers and scientific and technical personnel and in the norms of labor intensiveness. That is, the party committees, sector departments of the district committee, the economic services and specialists have something on which to work.

I feel that the position of some ministries is reflected to a great extent in examples of slowness, excessive self-confidence and perhaps the hopes that the usual "calamity would pass." Strange as it may seem, the ministry workers seemed not to note them during the period when passions began to warm up at the enterprises. No, we do not need "pushers" and plenipotentiaries, but the indifference is not understandable.

[Question] Special attention was devoted at the bureau meeting to the personnel of the new organizations. The main fraction of work was obviously entrusted to the party committees of the enterprises and to the rayon committees of the party.

[Answer] Naturally. And the approach was the same--the State Acceptance Service entered the category of the most important political problems and this was unthinkable without party influence. If I can put it briefly, I note that most party committees gave serious attention to this problem and sent competent and technically educated people to the State Acceptance Service. More than half of them are communists and the managers are all members of the CPSU. Staffing of the party organizations and selection of their secretaries is now being completed.

[Question] Filipp Vasilyevich, many other positive and negative facts were named during discussion of the results of readiness. I have noted that many operated from references to the kray newspaper ALTAYSKAYA PRAVDA and to the transmissions of local radio and television. Can one assume in all the preparatory work that the district committee supported the principle of wide publicity.

[Answer] This principle was obligatory in our work. And even in a broader sense. First, answering the questions, I note that the kray newspaper actually conducted a broad, open and topical conversation about the course of preparation under the special heading "Reorganization: Only Excellent Quality." All levels of the State Acceptance Service are touched on in the materials and the main thing is that the newspaper attempted and is trying to reach every person and to determine his attitude and position. After all, in the end the results will depend on honor, conscientiousness and principles of specific people at specific workstations. And if there are references to the bureau, this means that the newspapers, radio and television were able to see the essence of the problems and tried to analyze them correctly.

But people are concerned about much--about the moral and psychological climate of the reorganization, about measures for material penalties for rejections, measures for material incentives to workers and engineering and technical personnel for excellent quality. And how many questions are raised! Important ones, necessary ones and topical ones--about labor and production discipline, about new equipment and about social-domestic conditions. How can one not talk directly and openly about this?

The second aspect--and we support it--to avoid exaggerations and omissions through publicity through specific work with people and to utilize with the

greatest efficiency the reserves of the human factor. This is one of the most important tasks of all communists and of primary party organizations. This is necessary not only for today but for tomorrow as well. After all, conversion to state acceptance of all main industrial products will be accomplished uniformly during the 12th 5-Year Plan. Moreover, some enterprises, including those which introduced state acceptance, are converting to operational conditions based on self-financing principles, i.e., there concerns will not be lessened, but will be added to as well.

Finally, the work should introduce a new qualitative impetus to the general affairs of kray workers. The rates of growth of production volumes and of labor productivity comprised 6.5 and 6.2 percent, respectively in industry over a period of 11 months. Products worth 50,000,000 rubles above the plan have been sold.

There is every basis for the kray as a whole to cope with all the planned indicators in agriculture. Plans for turnover of grain, potatoes, vegetables and silk and for production and State procurement of milk have already been overfulfilled. Turnover of meat in the planned volumes to the State will be supported. One has been accomplished should be supported and should be developed in a new qualitative basis.

The State Acceptance Service, as one of the most important links of all work, will thus place much in its positions, will fill the overall competition for fulfilling the program of the 5-Year Plan ahead of schedule and with high quality, with new content and with a spirit of reorganization and acceleration.

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STATE ACCEPTANCE SERVICE IN GEORGIA

Moscow *Ekonomicheskaya Gazeta* in Russian No 52, Dec 86 p 8

[Article by G. Nikuradze, chief of territorial division of Georgian Republic Administration of USSR Gosstandart, and A. Gordiyenko, special correspondent, Poti]

[Text] The Poti Machine Building Plant for Hydraulic Mechanization has long and rightfully been considered a satisfactory enterprise by the quality of its manufactured dredges. It is no accident that all its products are marked with the State Emblem of Quality. However, even here there were cases of "overlap," and sometimes products with deviations from the State Standard were dispatched to far and near addresses.

The following order was established previously: the end of the month would approach and the sales service of the plant would order additional rail cars from the railroad workers for urgent dispatch of finished products. Emergency days almost never happen now and the State Acceptance Service has helped to eliminate them from work.

The state acceptance workers--they appeared at the plant as early as October--understanding that quality largely depends on rhythmic work of the shops, posed the question of bringing order to supply. The option of some accessory suppliers, who deliver makeup assemblies and parts for dredges to the machine builders, was turned into production delays. And communications with accessory suppliers were then established through the corresponding territorial organizations of USSR Gosstandart. The Poti workers sent more than 250 timely warnings and reminders to the suppliers. This induced some action--contract pledges began to be fulfilled within shorter deadlines.

One important problem was solved. But much still had to be changed at the enterprise itself. "Gaps" through which rejects sometimes "slipped" remained in the intraplant production chain. Failure to join individual production processes and weak interoperational control led to low quality. They knew about this, but instead of once and for all solving these problems, they patiently coped with the permitted defects. And, finally, time was lost on this. And then, at the end of the month or quarter, missed deadlines increased at the



plant. These emergency measures were naturally reflected in the quality of the finished product.

"From the very beginning, we have posed to ourselves the goal of not setting our service against the collective, but of solving problems that occur jointly, without reducing the demand for quality," says the manager of the state acceptance service T. Gogoli. "Together with plant specialists, we managed to eliminate many bottlenecks."

A new galvanic section, having double the capacity compared to the previous section, has now been put into operation at the enterprise. This permitted clear organization of intershop cooperation. Obsolete equipment, special fittings and accessories were modernized and in some cases were replaced. Additional test benches appeared at the plant. The requirements on the service of the department of technical control were increased simultaneously. A system of active multistep control: executor-team-production foremen-department of technical control, was introduced. Stiffer measures began to be applied to cases of rejects.

The State Acceptance Service at first had to listen to many reproaches and requests: after all, the plan is "burning up," while products are still uncertified, or they need to be certified faster. The state acceptance service refused to "enter the situation."

The Poti machine builders now know well: it makes no sense to "heap up" finished products to the state acceptance workers during the last days of the month to fulfill at any cost the sales plan--what the state acceptance workers have not been able to check will not be shipped to clients.

"It has of course become more complicated to work. One must devote ever greater attention to 'details,' which we have primarily skipped," relates the director of the plant K. Chikovani. "But one can now say with confidence that the state acceptance service has become a true ally for us rather than as a penalizing organization in the struggle for high quality. We have not had a single complaint from our clients in more than two months. And the rhythm of work has changed considerably. The monthly program has been fulfilled by 32 percent during the first 10-day period, by 33 percent during the second 10-day period and by 35 percent during the third 10-day period.

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**STATE ACCEPTANCE SERVICE IN VOLGA AREA**

Moscow **EKONOMICHESKAYA GAZETA** in Russian No 52, Dec 86 p 9

[Article by Yu. Zorin, chief of Volga Center for Standardization and Metrology, and V. Uylanov, special correspondent, Kuybyshev]

[Text] The State Acceptance Service began to operate at the beginning of September at the Kuybyshev Machine Tool Building Production Association. The first experience of interacting with the new service revealed facts, about which the workers of the association had to think a bit. The State Acceptance Service returned all five jig-boring machines for modification and correction of defects, which the plant department of technical control had accepted. As a result, 585,000 rubles was "lost" from the plan.

"We knew that there were many deficiencies in organization of the production process," admits the secretary of the party committee A. Grebenshchikov, "but as it turned out, we underestimated their real scales."

The bitter lesson was a reason for frank conversation at party meetings. Communists noted that preparation for state acceptance was extended, that approximately 16 percent of the equipment of the assembly shop does not correspond to imposed requirements and it requires modification.

"The course of technical retooling is causing serious concern among us," says the manager of the State Acceptance Service A. Vorobyev. "Introduction of justifiably rigid requirements on quality under the established conditions threatens responsibility for that which was earlier taken out of our hands."

The state acceptance service also revealed gaps in organization of the activity of the plant technical control service. Until recently, specialists of the department of technical control did not encompass the entire volume of control operations. To cover this gap for rejects, the subdivisions of a control service converted to the team method of organization of labor. A large manufacturing process, for example, modular assembly or general installation of products, was attached to each group of controllers. A system of incentives of working with fewer numbers was provided, but ...

"This system is 'working' weakly for the time being," says the chief of the department of technical control A. Kulyasov, "and the fact is that we are unable to determine how many people require our service due to the absence of norms of the labor intensiveness of control operations. Therefore, we are now engaged in working out these norms on the basis of actual time expenditures."

The changes in evaluations of product quality stimulated the machine tool builders to change the evaluations of the work quality of controllers as well. Low regulations for bonuses were confirmed.

We had a conversation with grinder L. Ponomarev at the section for finish modification of products:

"Introduction of the State Product Acceptance Service is a correct measure," said a worker. "But the following question concerns us: will we be able to raise product quality on equipment which has been operating for 25 years, is actually worn out and does not provide the required precision? We perform the most complicated operations on the only machine tool suitable for this."

The grinders can cope with the program up until now. But tomorrow, when the volumes of work increase sharply, the section will simply bog down. The problem of technical retooling of the association has been raised repeatedly to the general director of the association, to the chief specialists and at party meetings. However, there has not yet been any real changes.

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STATE ACCEPTANCE: QUALITY, RHYTHM, DISCIPLINE

Moscow *Ekonomicheskaya Gazeta* in Russian No 52, Dec 86 p 8

[Interview with Yakov Petrovich Pogrebnyak, secretary of the Central Committee of the Ukrainian Communist Party, by V. Shlomoy; first two paragraphs are introduction]

[Text] Organizations of the state product acceptance service have been created and have begun to operate at 299 industrial enterprises and associations of the Ukraine. The annual volume of industrial products of the enterprises that have converted to state control comprises 30 billion rubles.

Yakov Petrovich Pogrebnyak, secretary of the Central Committee of the Ukrainian Communist Party, talks about the first lessons of the State Acceptance Service and about the organizing and political work of party organizations in a conversation with our special correspondent V. Shlomoy.

[Answer] The Central Committee of the Ukrainian Communist Party recently reported and approved a number of initiatives, directed toward increasing the technical level and quality of products. Among them are the movement, initiated by collectives of the leading machine-building enterprises, to support the entire increase of production volumes during the 12th 5-Year Plan (44 percent) only by producing new highly efficient machines and equipment and by calling on the leading collectives of light and other sectors of industry for a sharp increase of output of competitive consumer goods.

The party organizations of the republic universally support these patriotic beginnings of the labor collectives. These initiatives have now been caught up in practically all sectors of industry. The fact that a fundamental change in product quality during the 1st year of the 5-year plan has not yet been achieved indicates their importance and significance. Moreover, fewer products of higher category of quality were produced in 1986 compared to 1985.

An analysis, conducted by sector departments of the Central Committee of the Ukrainian Communist Party, together with organizations of USSR Gosstandart, showed that the situation with the technical level and quality of products by the end of the year had become rather alarming: output of low-quality products is continuing.



Organizations of Gosstandart have repeatedly forbidden the sale of products manufactured with deviations from the requirements of State Standards. A number of officials, directly guilty for the rejection, were called to administrative responsibility. This is primarily true of enterprises of Minchermet [Ministry of Ferrous Metallurgy], Minlegprom [Ministry of Light Industry] and Minmestprom [Ministry of Local Industry] of the republic.

Many collectives have undergone discernible economic losses due to output of rejects. For example, fines of 9 million rubles were levied on the Kharkov Tractor Plant for sales of low quality T-150 and T-150K tractors of and the Odessa Precision Machine Tools Plant was deprived of almost 2 million rubles.

Among those who manufacture products with different types of deviations were the Zaporozhe Automotive Plant, Kommunar, the Donetsk Refrigerator Plant, the Dnepropetrovsk Mining Equipment Plant and the Thorez Electrical Engineering Plant. This situation of course cannot help but alarm the Central Committee of the Ukrainian Communist Party and its oblast and municipal party organizations.

A specific working program, which is now being implemented by all party organizations of the republic, was advanced immediately after the appeal of the CPSU Central Committee to the workers with the letter "On a fundamental increase of product quality."

Primary significance is devoted in it to conversion of enterprises to state acceptance.

In this regard, we have recently directed all organizing and political work in the labor collectives toward the fact that each worker recognizes: introduction of state acceptance of products is a rigid, but necessary measure.

[Question] A fundamental problem in introduction of state acceptance is preparation for it. Please tell us in more detail how successful and unsuccessful the party organizations of the republic have been.

[Answer] The party committees together with organizations of Gosstandart have primarily carefully selected the managers of all the state acceptance services. They are all communists, skilled specialists with higher education and with adequate work experience usually at the same enterprises. They were also interviewed in local party committees and at the Central Committee of the Ukrainian Communist Party. A careful analysis was performed in November on staffing the organizations of the State Acceptance Service. The picture was not as favorable as we expected: the staffs were completed by 50-70 percent at 170 enterprises and associations and even less at 49 enterprises and associations. The reasons were different: there was a shortage of highly skilled specialists at some places and other economic managers did not wish to "place on leave" their best people to new organizations.

The party committees had to interfere actively in these problems. At the suggestion of the Central Committee of the Ukrainian Communist Party, workers of

the sector departments of the Communist Party and Council of Ministers of the Ukrainian SSR, of the Ukrainian Gosplan, of the Ukrainian Gosstandart and managers of a number of ministries and departments were sent to local organizations to render specific assistance. The Central Committee, together with Gosstandart, held a number of meetings with directors, secretaries of the party organizations of enterprises and managers of the state acceptance service. The most active party and economic workers, workers of the machine-building complex, of metallurgy, chemistry, light and woodworking industries and of the construction material industry were covered in December.

Special boards and conferences were convened at all ministries with the managers of enterprises and chiefs of the departments of technical control. Party and worker meetings were held in the collectives. The programs of the political and economic education system were corrected with regard to introduction of the State Acceptance Service. The workers themselves of the state acceptance service studied at the republic center for standardization and metrology.

The departments of the Central Committee, together with the oblast and municipal party committees, for their part are doing everything now so as to support from the first days the high prestige of the newly created organizations, are forming combat-ready party organizations in them and are selecting principled, uncompromising party leaders.

[Question] A system of product acceptance by representatives of Gosstandart was introduced as an experiment in 1985 at a number of enterprises of the Ukraine. What did it demonstrate and what lessons did the labor collectives learn from this experiment.

[Answer] Indeed, ten large enterprises of different sectors were transferred to the new product acceptance conditions. As is known, two versions of acceptance were tried as an experiment: by the representatives of Gosstandart and of the client ministries. Strange as it may seem, the clients were unobjective recipients, frequently evaluated the product with regard to departmental interests and sometimes accepted known rejects if it was "favorable" to the plan.

After adopting a decision to create a State Acceptance Service, organizations of Gosstandart unfortunately lost the time required to staff the service and to work out the technical documentation, while the economic managers lost time for preparation of production to operate by a new method.

But the main lesson is that far from all collectives were ready to work under conditions of nondepartmental control. There is the understanding that the requirement of state acceptance is the most acute requirement of time, but breaking the old psychology at all levels, beginning with the worker and ending with the economic managers, is difficult.

As the first acceptance in October of this year showed, approximately 40 percent of the presented products were returned for modification. Products worth 400 million rubles were presented, but only 250 million rubles' worth were accepted.

Work with putting the design and production documentation in order and with preparation of a test and measuring base for all production was extended at many plants.

In this regard, some economic managers petitioned to postpone the beginning of state acceptance to 1988 and even beyond. The first deputy minister of light industry of the republic G. Nikitenko, the director of the Nikolayev Machine Building Plant for Hoist-Transport Equipment A. Vrokhov and other managers were criticized for this at a meeting at the CPSU Central Committee.

Alas, a facilitated approach to problems of quality deeply penetrated the consciousness of part of the workers, specialists and managers. This again clearly showed the first steps of state acceptance, when even selective control in individual sections of production sometimes led to shutdown of the sections.

The elementary requirements of the state acceptance representative to eliminate obvious defects (clean up burrs, finish a joint and so on) induced a storm of concern among some workers, team leaders and foremen.

This is yet another lesson of the first steps of the State Acceptance Service, which forces all party organizations not to weaken educational and political work among the labor collectives and to do everything so that the necessity of controlling high quality become a vital position of each worker.

Unfortunately, instances (although single instances) were encountered when immature economic managers tried to pressure and command workers of state acceptance organizations, forcing them to accept products known to be of low quality. This occurred at the Kharkov Modular Machine Tools Plant and at the Kharkov Machine Tool Building Association, at the Nikopol Crane Building Plant and at other plants. The party committees had to decisively correct these managers.

Other questions, solution of which can be found only through union organizations, were also revealed.

The State Acceptance Service does not fully encompass the entire cycle of development of the new product in some cases. Scientific research and design organizations, which are not included in enterprises and associations, are not encompassed by nondepartmental control, but the technical level of future products is also included in their developments.

And yet another acute question: the technical level and quality of many makeup products and materials lag significantly behind the requirements placed on the main product. It was established by normative documents that the requirements of developers of the final product are obligated to the suppliers of makeup products and materials. However, they are frequently disregarded in practice.

Already, for example, the collective of the Lvov Production Association Elektron is ready to develop a television set that exceeds the highest worldwide level, but the low quality of the component base and also of the phosphors and special steel for the picture tubes do not permit this.



The quality of merchandise of light industry also suffers largely due to the fact that enterprises of Minkhimprom SSSR [USSR Ministry of the Chemical Industry] deliver obsolete chemical fibers and poor dyes.

That is why review of obsolete State Standards, Sector Standards, specifications for raw material, materials and makeup articles, bringing them into agreement with requirements which are placed on the final product, must be accelerated and they must be encompassed by the State Acceptance Service.

I would like to touch on yet another question which obviously requires development on the part of Gosstandart and the ministries.

The possibility of combining some control operations of the department of technical control and of the State Acceptance Service for individual types of mass production products and such unique products as turbines, turbogenerators and powerful air conditioners must be reviewed to reduce the additional expenditures of material and energy resources upon acceptance of a product. Here is a specific example.

The workers of the department of technical control at the Plant Serp i Molot at Kharkov, which produces approximately 200,000 diesel engines annually, check and test every 100th engine. According to the rules of the State Acceptance Service, it was suggested that every 10th engine be tested. And this means 1.5 million rubles of wages to the testers, a large amount of fuel and electric power and additional areas for the test benches.

After working on the questions jointly, it was concluded that it is sufficient for the State Acceptance Service to test 5 percent of the engines. This requires additional expenditures that are one-fifth as much as the initial volume.

Or take another example: the total labor intensiveness of manufacturing a steam turbine is now 630,000 norm-hours, while another 10,000 hours are required for control tests and verification by the State Acceptance Service. These hours are charged to the cost of the product and are reflected in examples of the material incentives fund. But combining the control operations would permit a significant reduction of these expenditures.

And another problem. M. S. Gorbachev accused the state acceptance organizations of bureaucratic tendencies at a meeting at the CPSU Central Committee. The collective of the Zaporozhe motor vehicle builders, for example, encountered this: the volume of documentation required by the State Acceptance Service over a month consisted of 13,000-15,000 sheets. The plant workers had to place two "scribes" each in each shop and three each product representatives for this "paperwork." It is obvious that the state acceptance conditions must be modified with respect to conveyer and continuous mass production.

[Question] The first and main problem now is to provide order in production, to wage an implacable struggle with rejects and to explain the truth to all workers that our society can no longer permit output of low-quality products. What has



recently been done, Yakov Petrovich, based on these requirements, by the republic party organization.

[Answer] I will say immediately that work on formulation of sector Quality programs is being completed at some republic ministries and work of regional programs is being completed in oblasts under the supervision of the Central Committee of the Ukrainian Communist Party and the oblast committees. We feel that development of these programs itself is an important organizing beginning. Existing quality control systems must also be reflected in them, it must be noted.

Problems of improving executive and production discipline at the plant, extensive use of the possibilities of team forms of organization and stimulation of labor and economic levers for stimulation for output of high-quality products, introduction of the experience of leading enterprises and a struggle for rhythmic production as a necessary guarantee of high-quality work are at the center of attention of the party organizations.

Measures are being implemented in the republic on considerable expansion of output of new generations of equipment, assimilation of progressive technologies and on better use of the abundant scientific and technical potential.

This year alone, output of more than 1,000 new types of product, manufactured in the country for the first time, was begun and 1,500 obsolete products were taken out of production.

Calculations show that implementation of the measures planned in the republic will make it possible to increase 1.9-2.1-fold during the current 5-year plan the fraction of products with the State Emblem of Quality.

This is the goal, on achieving of which the labor collectives of the republic and their party organizations, together with state acceptance organizations, are working.

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STATE ACCEPTANCE SERVICE AT CHELYABINSK METALLURGICAL COMBINE

Moscow EKONOMICHESKAYA GAZETA in Russian No 50, Dec 86 pp 8

[Article by M. Kulikov, deputy director of the Chelyabinsk Center for Standardization and Metrology, and N. Gerasimov, special correspondent]

[Text] We found the chief rolling specialists G. Rapolov and other specialists in the office of the chief of the first section rolling shop V. Pirogov of the Chelyabinsk Metallurgical Combine. The mood of those present, we can say directly, was not very happy.

Rolled metal from high-alloy marks of steels is arriving at enterprises in different sectors of industry, who are in the leading positions of scientific and technical progress.

An integrated program on fundamental improvement of the quality and competitiveness of the product up to 1990 has been adopted at the combine. According to calculations of specialists, fulfillment of it will bring the metallurgists 42,700,000 rubles profit annually. However, the results of 11 months show that not everything has been smoothly organized as noted on paper. Specifically, the output of rejected steel is not being reduced.

"This fact causes special alarm," says the secretary of the party committee of the combine V. Plotnikov. "In October, the plant director A. Litovchenko signed a regulation about self-verification. Individual collectives and workers have gained the right to work on their personal reputation if they have had no comments on product quality and cases of violation of technology over a period of 6 months. Those who gain the right for this mark will win a production bonus of 25 percent."

And now the State Acceptance Service has showed on mill 780 that part of the product is being manufactured with deviation from the State Standard. Together with a representative of nondepartmental control, the rolling specialists analyzed the causes of rejection during our visit and sought a way out of the developed situation.

"A complicated situation has been established at the mill," says G. Ryapolov. "Renovation of it has been extended. We are unable to solve the problem through

our own efforts. There is no head machine-building organization which would manufacture the equipment for renovation of medium- and light-section rolling mills."

The Elektrostal Heavy Machine Building Plant was involved in this at one time, but the metallurgists are now requesting Mintyazhmash (Ministry of Heavy Machine Building) to distribute their orders at any of its enterprises. These requests frequently fall on deaf ears. Moreover, six of these mills require renovation at the Chelyabinsk Metallurgical Combine.

"We have sufficient funds for these purposes," explains the deputy chief of the technical department of the combine P. Yevstafyev. "Experience of efficient and high-speed renovation of blooming mills and sheet-rolling mills has been accumulated by the plant in cooperation with Uralsmash (Urals Heavy Machine Building Plant imeni Sergo Ordzhonikidze, Sverdlovsk) and the Novokramatorsk Machine Building Plant, but we are unable to apply it at the section mills--there are no equipment manufacturers."

The machine tool builders also do not always help the metallurgists. Five years ago, the Odessa Design Office of Minstankoprom (Ministry of Machine Tool and Tool Building Industry) and the Voronezh Machine Tool Building Plant together with the Chelyabinsk workers took on themselves the task of developing an experimental machine tool for machining large rolled steel sections, but the project has not yet been completed. It is still standing at mill 780 as a memorial to unthriftiness.

Senior rolling specialists of the wire rolling mill in the second section rolling shop M. Vorobyev, V. Murkin and A. Romanov told us about the difficulties with equipment repair. Urgent measures are necessary.

Since the beginning of the year, 23 shops of the combine have converted to the State Acceptance Service. It is staffed with highly qualified specialists. The new service establishes close business contacts with the shop collectives and operates according to a single plan.

Work at a number of other enterprises of the oblast is also conducted in a business-like manner--at the Magnitogorsk Metallurgical Combine, at the Magnitogorsk Calibration Plant and at the Chelyabinsk Pipe-Rolling Plant.

Unfortunately, they have encountered instances of procrastination and organization of the State Acceptance Service.

"It is very difficult for us to hire staff," said the manager of the State Acceptance Service at the Chelyabinsk forge-press plant in Dudarev. "Because of this, the schedules of selective checks in the shops are being interrupted and the norm-technical documentation is being reviewed slowly. There are still many obsolete monitoring and measuring instruments. The chief technician N. Kuznetsov and the chief metallurgist V. Stezhkin have essentially left the important matter to drift."

We sensed this acutely in a conversation with the foremen and managers of the spring shop. What should have been done in October-November, has been postponed to December-January.

"We must make up lost time," admits the chief engineer of the plant Ye. Romanov.

The following situation has developed: the State Acceptance Service is going its way and the plant is going its own way. This pattern has also been established at the pilot plant of the Production Association of the Chelyabinsk Tractor Plant imeni V. I. Lenin (the general director is N. Lozhchenko). Only 8 of 88 workers of the State Acceptance Service were hired here by the beginning of December. The tractor builders have essentially not begun to "roll" the new quality control system. Counting on getting some movement started may cost the collectives dearly.

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STATE ACCEPTANCE SERVICE IN PARTY WORK AT TBILISI

Moscow *Ekonomicheskaya Gazeta* in Russian No 50, Dec 86 p 9

[Article by L. Shcherbina, Tbilisi]

[Text] "He considered me his friend. But why did he consider me such? Did I really betray him in something?." These thoughts tortured Badri Ianovich Tabatadze for a long time. He did not understand immediately, but finally he did: "No, it was still correct to part with them. How many meetings and how many conversations we have had! But little changed after this."

What alarmed B. Tabatadze--the secretary of the party bureau of the Tbilisi Electric-Arc Welding Equipment Plant imeni Ye. O. Paton? What caused him to part with the chief of the department of technical control Georgiy Ashotovich Kevkhlyev? The report of communist, chief of the department of technical control G. Kevkhlyev was heard at a meeting of the party bureau in July of this year about the work of the service which he headed to improve product quality. The plant collective was prepared for state acceptance of products.

He planned to introduce it gradually: 25 percent of equipment will go through nondepartmental check in October, 50 percent in November, 75 percent in December and all plant products will be available to representatives of Gosstandart from the first of the year.

The conversation at the party bureau meeting was seemingly accepted. There were no different opinions and there could be none: product quality must be improved, including that due to improving the efficiency of the control system.

The enterprise is among the best in the sector: it reliably fulfills the plan, it provides an increase of labor productivity and it produces more than 70 percent of products with the State Emblem of Quality, but there is still much room for improvement. You do not see all of this immediately. But those can also provide a significant effect, seemingly on the surface--they need only to act.

Moving forward, let us say that the defects detected upon presentation of welding equipment to representatives of Gosstandart were mainly the result of

negligence, careless work and haste. Thus, from the first days of introducing state acceptance, it was necessary, without deviating, to solve the problem of strengthening discipline, order and organization and of increasing the responsibility of all workers for their jobs.

But first there was the report of the chief of the Department of Technical Control: losses due to rejection are being reduced, rejected articles have begun to be punished more actively by fines and the number of workers who produce excellent quality is increasing, those who are trusted with placing their personal stamp on a product is an indication of faultless work.

Everything was smooth. But they continued to "rob" technology in the shops. This is exactly what the team leader of the integrated team of the procurement shop Guram Artemovich Laliashvili said. Instead of ten operations provided by technology, seven are completed. Some material is replaced by other material--by that which is at hand. The test time was reduced. Who knew about this?

Everyone knew and everyone saw. And did they tolerate it? Frequently they did. Because the unique instinct of self-preservation cautioned: I can disrupt things without fear of serious consequences, but be on guard!

It turned out that instinct was insufficient. How was this at the end of last year, for example, when complaints came in against the plant products. Specialists had to go to correct the defects and also it was necessary to dispatch new equipment instead of the unsuitable equipment. The party bureau then levied strict punishment on many: both the chief of the department of technical control, the deputy chief of the sales department and members of the team that produced unsuitable units. It was suggested that the director of the plant review the question of the conformity of the position occupied by the deputy chief of the mechanical assembly shop and the chief of the production office (they were later transferred to other, less responsible sections).

That which happened taught caution.

"Some workers of one team came to me," says the secretary of the party bureau B. Tabatadze. "At first I felt uncomfortable. I understood them as a human being: they raised complaints against the comrades and this is not customary with us, team problems are usually solved within the team."

Incidentally Badri Ivanovich, having learned about the essence of the conflict, himself became wary. On the one hand, he could not help but be glad that they came to him for help, to the party bureau--this means they trust him. But on the other hand, if he is honest, all this hardly pleased him. He felt that the conflict was so complicated to take it outside his own collective. No, it turns out that his real friendship and comradely mutual understanding are in the team and you could not find two slipshod incidents to order.

Those two incidents seemed to be earned by those who "robbed" technology. It is time to go home, but the process of making up parts has still not been finished with respect to technology. This is not a misfortune! And it turns out to be

so. And it came down to a matter of time! Until the attitude toward quality under the new form of control began to change.

This case was not as simple as Badri Ivanovich at first thought. No, not only did he have to participate in resolution of a team conflict, but in solving the problem which the party advanced: to restructure the thinking and psychology of a human. He understood this later when matters had been corrected in that team, and if one is quite accurate--when they again turned to him for help.

Georgiy Ashotovich Kevkhayev endured this: they sometimes did not respond to the comments of the workers of his service at the plant. And what he required of the managers of one or another subdivisions was frequently left undone. And he asked in a friendly manner:

"Badri, help! The party bureau is after all the authority."

Tabatadze did not prepare any resolutions in this regard. He went into the shops and talked with people. He talked with everyone differently: he knew that he had to be strict with some, reproachful with others and to give advice to still others. This was generally his job--to work with people on a personal basis. But once there was a time as if they looked askance at what he was doing. And he said to himself: stop, you cannot support somebody else's weakness and you cannot patch up somebody else's lapses with the prestige of the party bureau. He then understood how different the requests for help, with which the workers and managers turned to him, really differed from his own.

It was hoped that communist G. Kevkhyev, when giving his report at the meeting of the party bureau, would talk about these very difficulties--difficulties of management and administration of the service, would attempt to find causes for them and would see that these causes are in himself. But this did not happen.

The work of the department of technical control to improve the quality of the manufactured product was recognized as insufficient and this was pointed out to G. Kevkhyev. There is the following formulation. A yellow card is given by the plant supervisors to those who committed the rejected work. There is also another collapse--you receive a red card and if you are good, you can print your personal stamp if you have this right. And the question may arise thusly in the application to the manager: give way to another, one who has more initiative and is more capable and who knows his job.

Is it easy to say to a person that has given much to the plant: you are not competent to your position. You avoid so much hurt and so many understandings this way. Having understood that a person will overcome himself in time, you fell on the side of justice. If he surrounds himself with a wall of alienation, no reasoning and no arguments will sway him. And what kind of situation then becomes established in the collective? Where is the guarantee that there would not be the following conversations: he has lived all his life at the plant and he is being turned out. So courage in these cases is simply necessary, as well as tactfulness and objectivity. And they must more and more frequently be manifested by both the administration and party bureau.

This questions troubled the secretary of the party bureau: did the manager of the department of technical control have a chance to correct himself?

After that memorable report at the meeting of the party bureau, B. Tabatadze talked more than once with Georgiy Ashotovich.

The problem had to be decided once and for all: state acceptance of products had begun. The people's inspectors, the shop party organizations, party groups and all 175 communists of the enterprise actively prepared for it. They closed many loopholes through which rejection penetrated, brought order in the technological documentation, made the necessary rigging, completed certification of workstations, conducted a three-shift operation in the most productive sections and organized closer contacts with suppliers. It was impossible not to adapt to the new requirements--one could not give out platitudes from a podium. To correspond to the high requirements, it was necessary to work on oneself and to grow. Not everyone managed to do this. The manager of the department of technical control was unable to do this as well. He is now the former manager.

Representatives of Gosstandart will become managers and assistants with full rights at 22 enterprises of the republic at the beginning of the year. And every party organization has to pass a unique test--on combat readiness. Much still remains to be done at the Tbilisi Plant of Electric-Arc Welding Equipment to improve the quality of the manufactured product. But the first exam has been passed with honors.

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STATE ACCEPTANCE SERVICE IN KAZAKHSTAN

Moscow *Ekonomicheskaya Gazeta* in Russian No 50, Dec 86 p 9

[Article by V. Belchikov, manager of State Acceptance Service at Alma-Ata Heavy Machine Building Plant, V. Vanyukov, deputy director of the Kazakh Center of Standardization and Metrology, and Ye. Kozlov, special correspondent]

[Text] The State Acceptance Service will be introduced at 38 enterprises during the new year in Kazakhstan. Representatives of Gosstandart have begun to work at some of them already. They have determined that many collectives are unprepared to work under conditions of increased requirements on product quality.

The Alma-Ata Heavy Machine Building Plant is the republic's leading enterprise. And even so, the State Acceptance Service determined that 70 percent of the documentation for manufactured machines do not correspond to the requirements of State Standards. This documentation is now being revised.

"Everything will be normal by the end of 1987," stated the chief designer of the plant O. Usenko. "We cannot achieve this earlier, there is much work to do."

The inexcusable unconcern in the past has been aggravated by the present slowness of the management. Is it really true that the plant will operate for the entire year according to the old documentation? Who gave so much time to the chief designer?

Representatives of the State Acceptance Service analyzed the technological precision of the machine tools. It turned out that only 30 percent of the equipment corresponds to certificate data. A specific group of machine tools had to be repaired and adjusted.

The plant also has a shortage of the required number of measuring instruments, specifically, for checking gearing. The chief engineer in the service has also not been concerned about the fact of supplying the production sections with instruments for checking the coaxiality and perpendicularity of bored holes in housing parts.

The applications for measuring tools are not being satisfied annually," complains the chief metrologist V. Pereplekhov.

Not everyone is being satisfied. And hardly anyone is guilty of this. There is also no guilty party with respect to the fact that the problem of an input check of electrical equipment and of hydraulic equipment has not been resolved properly. It is now done visually, since there are no special benches for this.

The party committee must also organize extensive educational work. The responsibility of many workers is still at a low level. Thus, representatives of the State Acceptance Service returned for modification the worm gears for the winding equipment: their quality was verified earlier as uncertified equipment, but the chief of the technical control office of the second machine shop V. Bykovskiy, who passed these products, sees no great misfortune in this. Or take this fact. The workers did not install the oil scraper when turning over the reduction gear. In their opinion, this is a small matter. But the absence of this "small matter" could disrupt the lubrication and cause the reduction gear to fail.

The first State Acceptance occurred in October at the Alma-Ata Sewing Association imeni 1 Maya. An unsightly picture was determined: 60 percent of sewing products accepted by the department of technical control were returned for repair. The main cause is production of defects: misalignments and asymmetrical arrangement of parts, twisting of finishing lines and so on. Meetings were held at the collective and the situation was corrected somewhat. But the latest results again indicate that no fundamental improvement of quality has occurred. Rejection of products is still high--35-40 percent.

Numerous alterations resulted in a breakdown of production rhythm. The sewing association is only half coping with established assignments. The conclusion is clear: the personnel must be educated, their skills must be raised and production must be improved. However, the management of the association (the general director is N. Mulyavina) tries to lay the blame for disruption of the plan on the representatives of the State Acceptance Service, as if they had begun this. Strange as it may seem, the deputy minister of light industry of the republic V. Shapoval also held to this position. Although it was noted that the administration must improve its work with people.

At the same time, one should listen to the valid requirements of the enterprise collective. We are talking primarily about a shortage of fabric of the necessary colors and supplies. The problem of bringing order to State Standards has also not been resolved. For example, the State Standard for pure silk and half-silk fabrics provides that they be evaluated as first grade if there are 15 defects, but only two defects are permissible in first-grade sewing products made from these fabrics. And there is an excess of such nonconformities.

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STATE ACCEPTANCE SERVICE AT AMURSTAL

Moscow EKONOMICHESKAYA GAZETA in Russian No 50, Dec 86 pp 8

[Article by Kh. Tuguz, journalist, and V. Bavin, special correspondent, Komsomolsk-na-Amure, Khabarovsk kray]

[Text] Two months ago, the collective of the Amurstal Plant, among the few in the kray, converted to turnover of finished products to the State Acceptance Service. There are 20 persons who check products outside the department. Among them are the experienced specialists of the plant. For example, the senior representative of the State Acceptance Service A. Nezhivoy is a former deputy chief of the open-hearth furnace shop, V. Zharakiy worked as deputy chief of rolling mill No. 2 and G. Mostovenko managed a group of the central plant laboratory. They all learned their trade among metallurgists. "They are knowledgeable and principled people," is said about them at the plant.

"The first test steps have been taken in a benevolent situation," the deputy of the State Acceptance Service at Amurstal V. Zatochnyy told us. "The new requirements force us to take a new look at the customary concepts and to undertake the reorganization on a thorough basis."

The State Acceptance Service rejected more than 6 percent of products (approximately 5,000 tons of rolled steel), which was presented for verification, as not corresponding to the State Standard. The first sad results were discussed at a joint meeting. It did not help that some steel smelters were in a quandary--nothing like this had ever happened before: the steel was shipped to the client even with the State Emblem of Quality. Shipwrights, builders and Arctic enterprises accepted it. And now here are many thousand tons of rejects.

However, emotions soon gave way to business-like discussions. First, one thing is clear--a high-quality product on equipment, a third of which is physically obsolete at the plant, cannot be manufactured. It is difficult to achieve quality on poor raw material and on semifinished products, manufactured with violations of technology. Not all the line managers, team leaders and technicians were psychologically prepared for the State Acceptance Service. The necessary explanatory and educational work was not conducted in all the

subordinate collectives. The comments made at the meeting were converted to specific measures to reorganize the work of the metallurgists and to improve the plant standards and KSUKP [comprehensive production efficiency management system].

From the very beginning, the workers of the State Acceptance Service organized their activity so that production would be checked at all stages--from loading the charge to production of rolled steel, packaging and dispatch of the finished product. The main goal is to find ways and methods together with the metallurgists to improve the production quality and skills.

The experience of Amurstal is now being studied at hoist-transport equipment, electrical engineering and other plants of the enterprises of the Kray, which have been converting to the State Acceptance Service since January.

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STATE ACCEPTANCE: QUALITY, RHYTHM, DISCIPLINE

Moscow EKONOMICHESKAYA GAZETA in Russian No 50, Dec 86 pp 8

[Text] A few days remain until the beginning of introduction of the complete state produce acceptance service at 1,500 enterprises. How is preparation going?

L. Lapidus, deputy chief of the Main Administration of the State Product Acceptance Service of USSR Gosstandart, reported to the editors that personnel of the State Acceptance Service are being staffed at enterprises of 28 ministries. Managers of the new service have been confirmed in all subordinate subdivisions, but there are only 15,000 of a planned 25,000 staff of workers of the State Acceptance Service.

The plants and associations now present an average of 30-35 percent of manufactured products for checking outside the department, although an ever larger number of enterprises is aiming for 100 percent. The collectives of Minenergomash [Ministry of Power Machine Building] and Minkhimprom [Ministry of the Chemical Industry] have especially prepared well for the State Acceptance Service. The percentage of products turned over upon first presentation to representatives of Gosstandart, as before, remains low at enterprises of Minstroyaterialov SSSR [USSR Ministry of the Construction Materials Industry] and Minstroydormash [Ministry of Construction, Road and Municipal Machine Building]. As the materials of the surprise raid show, not everything is yet favorable at some enterprises of Minchermet SSSR [USSR Ministry of Ferrous Metallurgy].

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## STATE ACCEPTANCE SERVICE IN BELORUSSIA

Moscow EKONOMICHESKAYA GAZETA in Russian No 52, Dec 86 p 9

[Article by V. Derkachev, deputy director of the Belorussian Center for Standardization and Metrology, A. Dmitrakovich, chief of the Department of State People's Inspection Committee in Machine Building, and Ya. Glezer, special correspondent, Minsk]

[Text] State acceptance of products is under way at more than 80 enterprise and associations of Belorussia. Tractors and automatic lines, television sets and motor vehicles, machine tools with numerical program control and watches, furniture and clothing, road machines and instruments, are going through the quality control check.

One can cite many examples of conscientious preparation toward State acceptance. Among these collectives are the Production Association Minsk Tractor Plant imeni V. I. Lenin and the Mogilev Plant Stroomashina.

There are many letters in the abundant mail, which arrives daily at the Minsk Refrigerator Plant--the pilot enterprise of the Production Association Atlant--from buyers, which begin with the words: "Thank you for a good refrigerator," "We are grateful for trouble-free operation of the equipment," and "produce more of these refrigerators." The demand for domestic "cold factories," manufactured at Minsk, is high not only in the USSR. They are also willingly purchased abroad: in France, England, the Federal Republic of Germany and Italy.

The quality of Minsk refrigerators can also be judged from the results of the State Acceptance Service, which was introduced here in November 1986. Not everything proceeded smoothly at first. As the manager of the State Acceptance Service at the enterprise N. Petrovich reported, 1.3 percent of the products, intended for the export market, was returned for correction of deficiencies. This figure was reduced to 1 percent in December and there is every basis to assume that it will be reduced to 0 this year.

The collective is entering the 2nd year of the 5-year plan with a good attitude. They completed the 1986 state plan ahead of schedule. They produced almost 2,000,000 rubles worth of products above the task, including 4,000 refrigerators.

Unfortunately, this is not the case everywhere.

State acceptance of products began at the Minsk Road Machine Plant Udarnik at the end of October 1986. The first results showed that enterprise is not ready to work under conditions of increased requirements on product quality. What are the causes?

Input control of the makeup products has not been properly organized at the road machine plant. This is primarily true of the hydraulic distributors, hydraulic cylinders and cast casings. Special benches and control instruments are required to check their quality. But the absence of these instruments is due to the fact that the managers are little concerned. Violations of production discipline have become common at the plant. The bitter activity of the department of technical control leaves much to be desired. The complaints coming through the plant are not analyzed and there are no reliable data on the operation of the machines manufactured by the plant.

One hundred percent turnover of products to State acceptance was begun on 1 January. It is interesting how the administration (the plant director is V. Shlyndikov) and the party organization (the secretary of the party committee is I. Azarov) now plan to extricate themselves from the situation in which the collective finds itself through their fault?

Acquaintance with the situation at the Production Association Gorizont permits one to conclude that they are mainly ready to work under conditions of a complete State Acceptance Service. Measures have been worked out and implemented to improve product quality at all stages of production.

Even during the first days of State acceptance, the workers and engineering technical personnel of the association understood that there would be no indulgence. The section foreman A. Mikhaylov and the control foreman A. Seleznev present a lot of 100 Gorizont color television sets to the new service. The representative of the State Acceptance Service A. Petrusha detected defects in a number of sets. The entire lot was returned to the container and those responsible for the rejects were penalized. The story was repeated several days later, but this time by foremen I. Solovyev and M. Bartosh. Nothing was left for the representative of the State Acceptance Service O. Dibrov to do then to return 40 Gorizonts for correction of defects. In November 1986, nondepartmental control "vetoed" a total of 1,190 television sets and 322 radio receivers.

Much has been said and written about these serious claims against the quality of Gorizont color television sets. And although the number of complaints in 1986 has been cut almost in half compared to 1985, there are still complaints. Careful analysis of the complaints is being conducted at the enterprise and measures are being adopted to correct the situation.

The products of the Minsk Motor Plant enjoy deserved praise in both the Soviet Union and abroad. Conversion to state acceptance occurred in phases at this plant. At first, 20 percent of the engines were checked, then half of them were

checked and then three fourths of the products were checked. All products have been checked since January. Despite extensive preparatory work, it is still not been possible to avoid rejects. An average of 3-4 defects is found for each returned engine. And they were all mainly committed through the fault of the executors: mechanical damage, failure of housing parts to match or an untightened bolt or nut. The defects are minor, but these engines are the heart of the well-known Belarus tractor.

The motor test station, which has been unable to cope with the increased loads, became the bottleneck at the enterprise. And whereas the plan was sometimes "eradicated" due to reducing the test conditions prior to introduction of the state acceptance service, a truncated version is not acceptable now. The unsuitable practice has become a part of the past.

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PRAVDA EDITORIAL CRITICIZES LOW QUALITY OF PRODUCTION EQUIPMENT

Moscow PRAVDA in Russian No 317 (24939), 13 Nov 86 p 1

[Abstract of editorial: "Machine Builders' Obsolete Products Hold Up Steel Industry Modernization"]

[Abstract] The editorial reviews the progress of the extensive program that has been launched for reconstruction and modernization of the ferrous metals industry. Successes are noted at a number of plants, where modernized shops already have been commissioned. At other plants, however, the editorial reports building contractors have not met their obligations, and other kinds of problems are holding up modernization. The editorial singles out machine builders and other suppliers for criticism. It is said that many types of production equipment offered by machine builders still are inferior to foreign counterparts with respect to reliability, level of mechanization and automation, excessive metal content, and requirements for spare parts and lubricants. Available equipment lacks reliable control systems and certain types of hydraulic apparatus and electric motors. The editorial states that metal producers have a right to expect much more from the heavy machinery, machine tool building, power machinery, electrical equipment, and instrument industries.

It is observed that one of the reasons that up-to-date equipment is not available is that machine building ministries, as a rule, will not begin developing new equipment until the funds for it have been allocated. The editorial says development of new technology must be a continuous process. The USSR Ministry of Ferrous Metallurgy reportedly has drafted more than 300 requests for proposals just for its most basic types of equipment. Machine builders, however, are said to be trying to stick to the old ways of doing things. After reviewing a request for new installations at two steel industry plants, the Staro-Kramatorskiy Machine Building plant proposed equipment that was essentially the same as what has been used for decades.

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SLOW ACCEPTANCE OF AUTOMATED SHARPENING MACHINES DISCUSSED

Minsk NARODNOYE KHOZYAYSTVO BELORUSSII in Russian No 11, Nov 86 pp 13-14

[Article: "'Mastodon' In the Sector"; first paragraph in boldface by NKbB]

[Text] Designers have created equipment permitting automation of the sharpening of practically all metal-cutting tools. However, the enterprises continue to prefer to deal with machine tools requiring manual labor. Why? V. O. Sitov, delegate to the 27th CPSU Congress and chief of the Vitebsk Gear-Cutting, Grinding and Sharpening Machine Tools SKB (special design bureau), shares his thoughts on this.

As the leader of a full-function SKB, I've helped check out and release a variety of equipment for machine tool manufacturing plants in five union republics. On these business trips, I familiarized myself with more than just the basic production our machine tools were being used in. I was interested in the technical level of the auxiliary shops and sectors, and especially in the sharpening departments. The contrast was astounding! At a giant like the KamAZ engine plant, for example, though you see a huge collection of automated equipment operating with minimum human supervision in basic production, it's worthwhile to stop in at the sharpening department. It's as if you had gone to a completely different enterprise. There are a large number of manual multipurpose machine tools, each with a [female] worker bent over it. The proportion of manual labor is very high.

This is a typical situation we encounter at every machine-building plant.

Perhaps there's no equipment for automating these jobs? As a specialist who has dealt with developing sharpening equipment for many years, I can say that our plants are producing semiautomatic, primarily NC, machines which permit automating the sharpening of practically any metal-cutting tool under multiple machine-tool servicing conditions. However, they comprise a small proportion of total commodity output at machine tool manufacturing plants due to a lack of orders.

In order to reveal the industry-wide demand for modern automated sharpening equipment and familiarize consumers with its operating and technical-economic characteristics, we held a unionwide symposium to which we invited workers from the ministries in charge of supplying plants with sets of equipment,

associates from the lead planning and technological institutes, and representatives of various plants. Customer experience in operating our sharpening equipment was also analyzed. This has enabled us to understand the reasons for the limited demand and to draw certain conclusions.

Automation of these jobs is hampered by a lack of proper information among machine tool consumers and plant designers and by a lack of confidence among line personnel about the reliability of NPC machine tools. A majority of the enterprises lack specialists to service such equipment and lack the conditions for training them.

Managers are also confused by the fact that manually-operated multipurpose tool-grinding machines are more productive than certain semiautomatic NC machines. But they are completely ignoring the fact that we obtain outstanding quality in the latter instance.

However, I think the primary economic, organizational and social reasons are the following.

Tool sharpening on automatic machines and flexible modules improves their strength five-fold or more as compared with manual sharpening and, as a consequence, the plant's requirements for expensive tools are sharply reduced. On the other hand, that can negatively affect its economic indicators, since tool use and expenditures on tool reconditioning and maintenance are significant and are shifted in toto to the cost of the plant's commodity output.

Old equipment presupposes multiple machine-tool servicing. But if a department with manually-operated machine tools puts in an automatic one, it will naturally need to put in a tool grinder as well. What, then, is the status of this "lucky one"? When he worked at a manually-operated machine tool, he was paid at rush-job scale, he had a larger food allowance, additional leave and the right to early retirement at age 55. Now, he is deprived of all that and earns less. Do the people in the sharpening department need or like a machine like that? I would venture to guess the answer is "No!" So there is often friction between the manufacturer and the consumer when the equipment is introduced into production. Something like that also happens when a modern, highly automated machine tool designed for power grinding at a speed of 60 m/sec arrives at a sector which has dozens of its older brothers, operating at speeds of 25-30 m/sec. The production difficulties which arise are resolved quite easily: the automatic machine is turned off and its speed is decreased to 25-30 m/sec.... Then, a year or so later, everyone is surprised that this "mastodon" ever got shipped from the machine tool manufacturing plant and wonders what "thinker" ever dreamed it up.

There can be but one fundamental resolution to this problem: comprehensive retooling of the centralized tool sharpening departments, meaning replacing all manually-operated machine tools with modern, semiautomatic machines and modules which ensure quality sharpening, multiple machine-tool servicing and, as a result, a sharp reduction in the plants' need for expensive tools and workers to recondition and maintain them.

Calculations show that capital expenditures will be recompensed, with change, in basic production, since cutting feeds, speeds and depths can be pushed with high-quality tools, equipment idle time associated with tool replacement is reduced, and, especially importantly, machining quality is improved. It has become necessary to create maintenance and machine tool repair services at the machine tool manufacturing plants.

Moreover, we need to review the standards for a number of tools whose designs were developed on the assumption that they would be sharpened by hand.

The tasks stemming from the resolutions of the 27th CPSU Congress and the "Basic Directions of National Economic Development" bind us to fundamental restructuring. It must begin by breaking with static views about the development of basic and auxiliary production, with the producer-consumer relations that have evolved over the years.

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TECHNICAL COUNCIL: A DESIGNER'S NOTE

Minsk NARODNOYE KHOZYAYSTVO BELORUSSII in Russian No 11, 1986 pp 15-16

[Article by V. Bondarenko: "Technical Council: A Designer's Notes"]

[Text] As with people, machine tools have different destinies. Some serve to a ripe old age and others don't last half as long. I'm reminded of the time a rather drunk stevedore hooked up a machine tool just accepted by the OTK [quality control department] and gave the woman operating the crane the "lift" sign. She raised the load.... The tie-rope jumped off and in an instant, that expensive item was transformed into two tons of scrap. That's another "fate."

But why be thinking such unhappy thoughts now, as the technical council begins its meeting? A premonition of a difficult discussion to come with the designers?....

Today's meeting is unusual in that three projects will be reviewed for the first time. On the one hand, that's good, because it will be interesting to compare the creative potential of different design schools and their different approaches to technical problems. On the other hand, a "pig in a poke" might result from the unavoidable haste. After all, we, the manufacturers, have to accept a complete and faultless plan from the planners in order to bring it to life in the form of a machine tool.

I was unlucky: "my" machine tool will be reported on at the end, when everyone is tired and their judgement might be rushed. A planner needs only one thing: fewer comments and corrections. He would rather get his hands on the document sooner. That he can understand, and after all, the company nameplate only indicates the manufacturing plant.

The first machine tool is being defended, and I look around at the familiar faces of those assembled in the technical council.

Nikodim Nikodimovich, our chief engineer, holds court in the middle of the U formed by pushing the tables together. He turned 60 last year, but it looks like he doesn't intend to be dependent on a retirement pension. He's a huge man, with a heavy, broad face. We are all a little afraid of him. They say he was once energetic and tough. He loved to say, slapping his palm on the table, "I am the GOST [all-union state standards] at this plant!" And then, as he grew older and slowed down, indifference appeared in the gaze that once

flashed with lightning. But he was now alertly following the flashing pointer on the drawing and taking notes.

Following the etiquette, on his right was Boris Nikolayevich, the chief designer and my boss. He is a recent arrival at the plant, a replacement for the previous "demoted" chief designer, who was self-important, hot-headed, quarreling until he was hoarse with the chief engineer and insisting on having his own way. Labor intensiveness ate at him. He said, "The main thing for a designer is to create a reliable component. Labor intensiveness is a secondary matter." The bosses didn't like statements like that. The plant had a different slogan: "Lower labor intensiveness!" And wags added "...at any cost."

We don't know this new chief well yet, so we're looking him over and he's looking us over. It looks like it'll work out, if he just doesn't get into "squashing" the technology department. If he does, to hell with him.

Nikolay Anisimovich, the chief technologist, is naturally to his left. A good man. In 15 years, he rose from the ranks of the designers to be among the chief specialists. He's bold to the point of audacity in technical matters, forceful and demanding. Hard to stand up to. Nikolay Anisimovich is hard-eyed and tight-lipped. Leafing through the papers today, he roots out the "tumors" like some grazing animal....

There are a total of 20 people in the technical council office: shop chiefs, department heads, design staffers, technologists, supply workers. Some clearly have nothing to do: they daydream or read a pamphlet. The tool shop chief is trying to stay awake: his time will come later, after the machine tool is in production.

They say the fate of the project is decided in the technical council. Not true at all. If you follow the speaker's pointer, you don't get very far into the design. The more so, since he is generally trying to detour around the weak points of his offspring. If the fate of a finished project depends on someone, it is the designers at the manufacturing plant. Not only on their professional skill, but on their principles and their resolve to fight with the planners, the chief specialists and the line technologists, who are also studying the new drawings, for the sake of the cause -- all this is reflected in the quality of the machine tool. The abrasive-stripper will apparently be accepted without much disagreement. The fact is, the specialist who should be accepting the machine tool is sick and his boss is on vacation. Some planner agrees to make a correction; there isn't time to check the rest of it properly....

Listening to the chief designer and glancing at the drawings he's hung up, I catch myself looking for weak points. Habit or the conditioned reflex of self-preservation? After all, a weak point is a potential defect, and you wouldn't want anyone to know that a defect was your fault.

My thoughts are interrupted by Matvey Yakovlevich, the leader of our bureau. He pokes me in the ribs with his elbow and points toward the speaker with his eyes: "See how the machine tools are getting more and more complicated and

expensive year after year, sometimes without reason. Some sort of mass size-mania. I remember in the late 50's when our machine shop made a fixture from free-hand sketches by an innovative milling machine operator here. It was smaller than a stool, even though it was designed to deburr gears. The component's small size was achieved by fastening the fixture onto the gear, rather than the reverse. You could operate it on an office desk. But now, look at the same kind of fixture a quarter of a century later, as produced by the SKB. So many drawings, the full width of the room. But the technological potential and the productiveness remain the same, to my mind."

Of course, Matvey Yakovlevich is exaggerating a little. Still, one must agree with the old designer's observation: unjustifiably large, complex and expensive machine tools are being developed for many simple technological operations. This disease is a consequence of the domination of the notorious "inertia." The diagnosis has been made and the treatment has been prescribed, but machine building's recovery has dragged on: we've been slow to figure it out.

I'm reminded of something that happened last year. A colleague and a sensible design engineer, Anatoliy Anatolyevich, came up to me once and asked what seemed to be a childish question, "Do you need money?"

I looked up. No, he wasn't joking. He looked serious. It turned out the documentation for one of the machine tools needed updating. In the course of using it for several years, there had been so many new GOST's, various RD, RTM, RTD, STP and other kinds of so many corrections made to the documentation, that there was no more space for any on the tracing-paper. It was, all in all, a mechanical job which was to be subcontracted to a KB [design bureau] in another city. When he found out what that was going to cost the enterprise, Anatoliy Anatolyevich couldn't stand it and rushed to the chief engineer. "What are you paying that kind of money for?! I'll do the same work with a brigade of designers and [female] copiers twice as fast, better, and for a third the money."

But nothing came of it. A couple of days later, my friend came to me again, smiled wryly and said, "Somebody else's daddy, you know, they don't worry about what it costs. But they offered to let us update the design...on a voluntary basis."

The animation in the office returned me to reality, as the floor was opened to questions. I asked one. "Why does a small machine tool with a single operator's station need a detachable control panel?"

The answer was slow in coming. "I suppose your observation makes sense. We also thought about that, and if you insist, we'll do some more work on the design. But you know yourself that it'll take us at least a couple of months."

Judging by the response in the room, I understood that the speaker had hit the mark. The stripping machine was already "sitting" in the new-equipment plan. The ministry would hold us strictly to account for that.



"But did you read the IZVESTIYA article? They called it the Ivanovo phenomenon," somebody said. "You know, at Kabaidez the project gets from design to the quality control department in a year, but here, it takes two months just to finish the control panel!"

"That's Kabaidez, and this is here...."

Next question: what prototype was used for the machine tool? It turns out that a model made by a foreign company served as the analog. "But we improved it," the designer hastened to add. Everybody smiled knowingly: I should think so, good fellows!.... It was no secret to anyone that the year the "prototype" came out was in the early '70's. That's where the economic effectiveness of nearly half a million rubles was reeled in, by modernizing some old stuff.

...I am reminded of another story. Six months ago I was called to Moscow on business. I didn't want to go, because the reason for it was clearly some bungling. The charts I had approved just four months ago "for three years ahead" turned out to be invalid there in Moscow a month later.... And, as sometimes happens on the road, I opened up to the person riding with me, taking a dig at the Gosstandart [State Standards Committee]....

My companion was sympathetic. "It's true, there's a lot of really dumb stuff that goes on with the GOST's. It takes 70-80 signatures and stamps to approve some designs. But that's a temporary phenomenon. The USSR Council of Ministers Decree 'On Organizing Standardization in the USSR' will set things straight. It's hopeless to think that introducing a needed standard is the most profitable measure. So the intention is to reorganize the work of the Gosstandart. In particular, many relatively ineffective GOST's are to be rescinded. But you, a young person, shouldn't be reproaching others. You're a bungler too, after all."

"What do you mean, a bungler?" I burst out. "Sixty-five percent of our output has the Seal of Quality and it's shipped to 37 other countries...."

But where, exactly? The Middle East, Africa, Latin America....

"Last year, a developed capitalist country bought 10 of our machine tools."

"...But your OTK chief was summoned overseas in that connection. You ended up dropping the price of those machine tools. Simply put, you gave away two of the 10. Your machine tools operated normally, but one leaked oil, the paint was peeling off another.... So there's your GOST. You spiffed up a prototype and received the cherished pentangle. But then the state commission left and you started making them any which way."

"You don't have to look far to find out why. Was it really all that hard for your director to find out those actually to blame for the defects? But I'm sure that wasn't done. The director felt sorry for them: After all, it did work. If you deprive them of their progressive-item bonuses, each family will suffer.... Blanket forgiveness gives rise to carelessness among subordinates, to violations of labor and technological discipline, and to defects."



It turned out that my companion was right, both about our plant and about the situation on the world market as a whole.

What he said affected me profoundly. Not the fact that I didn't know about any of this before, but precisely because it was right there, in that car, that I felt for the first time ashamed to call myself a designer.

In our folk traditions and in our engineering thought, humanity's achievements have been astonishing. So if I find out that Fujitsu Fanuc of Japan has created a robot-plant, I'm surprised not by the technical accomplishment, but by the fact that it didn't happen here first. What is it that our scientists and engineers lack?

For the first time in many years, I had this simple thought: somebody, sometime, graduated from college with the same store of knowledge as I, but that someone for some reason has turned out to be "smarter" than I. But I'm no fool. After the institute, I received six certificates of invention in five years of work, and those inventions were used and had a considerable economic impact. So does that mean I could handle a heavy workload for a short time, but was not up to the long haul? Not at all!

In the meantime, a second speaker and his drawings had appeared. He brought out the design for a high-precision boring machine which had to replace ours which, though it is reliable, is an obsolescent off-the-shelf item.

Great hopes are being placed on the new machine tool. The ministry has long been saying that our plant is bringing up the rear in machine tool manufacturing. That became more noticeable late in the 10th Five-Year Plan and early in the 11th, when a policy of using high-efficiency, high-precision equipment was adopted. Some specialists, inspired by the general trend, favored radical plant renovation so we could "get" to machining centers. But the chief engineer took the hot-heads in hand: "Stop this projectifying!" When nothing came of the machining center, someone suggested this boring machine. So now that the work had resulted in a design on paper, it had to be evaluated.

I hear the foundry chief whispering, "How do you like that? They want to palm a one-piece frame off on us. And how am I going to cast it in our little shop? How will the machinists make it?"

The fact is, our plant is in constant conflict with the "Tsentrolit" [not further identified]: sometimes more than 70 percent of the Tsentrolit castings must be certified as defects and shipped back to the plant. Our casting shop tried to set up a sector serviced by the Tsentrolit workers. They come here at 8 a.m. and leave with us, like they're supposed to. A plant within a plant. And so, recognizing an opportunity, the foundry workers will not, under any conditions, undertake to make a casting that's even the slightest bit complicated.

The speaker stopped alongside the last drawing and fell silent. He was peppered with questions. "What guarantee is there that high-precision bearings can be fabricated? In the design, the gears are 5th-degree

precision, but the plant can ensure, at best, 7th-degree.... Couldn't the gearing requirements be eased, and some of the norms too, while we're at it?"

My colleagues were asking these questions. One would think they would be wondering how to make the machine tool more accurate, reliable and durable, but in fact.... At this point, the speaker blew up. "Do you want to produce competitive machine tools or not?"

Now that's more like it! When preparing for the technical council, I expected to see the familiar picture of designers palming off crude, very imperfect products and we, after squabbling for the sake of appearances, accepting them as first-rate. And that was essentially what happened with the first machine tool. But the person who presented the second one woke us up. He was standing up for competitiveness, and we seemed to be throwing a monkey wrench into the works.

Over the years, we've all gotten used to output that could be corrected on the fly by obtaining continuous authorizations, "by way of exceptions," to pass on defective parts for assembly, making them fit, with a file or an emery wheel, one after another.... After this, micron-precise tolerances seemed unjustifiably tight to us and economically inexpedient. We considered them idle whims or muddling on the part of the designers. Accustoming people to higher production standards, to "re-evaluating values," would apparently be somewhat harder than providing the plant with new equipment and obtaining new materials and assembly components. All the engineers here have enough work.

And what about me? Should I keep on try to get the designers to "take our generation into account" and make things simpler and cheaper, to ease the requirements? I'm reminded again of my companion's words: "The Japanese needed 10 years to achieve a break-through in quality. I'm sure we have everything we need to solve this problem faster. But on one condition: in this huge country, everyone must convince himself that there are in fact no 'other fish in the sea.' He is the reference point on the parabola of quality, efficiency, and everything else.... Are you prepared to be such a reference point in your own job, small though it may be?"

So, the ball is in my court....

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WHERE SHOULD MACHINE TOOLS BE REPAIRED?

Minsk NARODNOYE KHOZYAYSTVO BELORUSSII in Russian No 11, Nov 86 pp 14-15

[Article by V. Lisitsyn, junior scientific associate at the Economics Institute of the Belorussian SSR Academy of Sciences: "Where Should Machine Tools Be Repaired?"; first two paragraphs in boldface by NKhB]

[Text] ...Sooner or later, this question comes up at every enterprise. One wouldn't think it would be hard to decide: just turn to one of the specialized "Soyuzstankoremnaladka" [not further identified] VPO plants. They do good work, the equipment is modernized in the course of major overhauls.... These are undisputed advantages of that service organization.

But Belorussian industrial enterprises are unwilling to use its services, first of all because of the time the repairs take and the high transport outlays: equipment drops out of the production process for 2-6 months and shipping expenses are 60-70 percent of the net cost of the repairs....

This is why in-house repairs are so common in the republic. Both the specialized services and the consumers of those services are within a single enterprise and are subordinated to a single administrative center. This enables repair workers to respond quickly to customer orders and to give maximum consideration to their interests.

At the same time, the low volumes of work at any one plant do not permit setting up technology at a high level. The inadequate development of specialization and the necessity of doing the entire complex of jobs -- from maintenance to major overhaul and even to manufacturing spare parts -- significantly reduce service effectiveness. Of course, the large machine-building enterprises can set up specialized brigades and do the work well. But there are few such enterprises in the republic. Only effectively five percent of all the plants using metalworking machine tools can rebuild them properly on their own. Other, smaller machine-building enterprises and all the nonmachine-building plants and factories lack such opportunities.

Naturally, both the quality and the effectiveness of the work are significantly poorer. Thus, the labor intensiveness of 1A6616 machine-tool major overhauls at the Minsk Furniture Plant is 40 percent higher than at a specialized plant. The new cost of completely rebuilding a Model 163 engine lathe at the Minsk Automotive Repair Plant is nearly half its balance-sheet value, and the cost of rebuilding a Model 1K62 machine tool is more than 60

percent of its balance-sheet value. And more than half of all the republic's metalworking equipment is at such enterprises.

The inefficiency of in-house major overhaul is one reason for the constant growth in expenditures. Thus, these expenditures have been increasing by 7-8 percent per year in Belorussia and now exceed 325 million rubles. Delayed, poor-quality repair translates into losses of 15 percent of the available working time. And on a republic-wide scale, that means a loss of tens and hundreds of millions of rubles worth of output.

Understandably, counting on in-house repairs is only a consequence, a response by industrial enterprises to the shortcomings of the existing ways in which metalworking equipment servicing is organized.

The policy of intensifying the national economy in the 12th Five-Year Plan demands rapid updating of fixed production assets, improvement in the reliability and durability of technology, machinery and equipment. The operation of robots and the automatic lines created on their basis demands that the repair services be restructured as well. In fact, each industrial enterprise is simply not in a position to service such complex equipment properly. How can the problem be solved?

One of the most progressive ways is through so-called "company service," in which the manufacturing enterprise assumes the responsibility for the uninterrupted operation of the equipment it produces. Direct producer-consumer ties enable the former to obtain all the information needed on how the equipment is operating and to eliminate design and technological flaws promptly. The manufacturer is directly interested both in producing quality equipment and in producing the necessary spare parts and setting up the servicing.

Unfortunately, company service is not appropriate for metalworking equipment servicing, primarily due to the great variety of machine tools in operation. For example, the Luch Footwear Association in Minsk uses machine tools produced by more than 20 plants, and the Mir association uses machines produced by more than 40 plants. These are enterprises with a total of only 120-300 machine tools, but there are machine-building plants with up to 1,000. To set up company service for them here would require the construction of republic branches of practically all the country's machine tool manufacturing plants.

The reserves for improving the effectiveness of repairs lies in their more intelligent territorial organization. For example, it has been proposed that equipment major overhaul interplant specialization be concentrated in the republic's manufacturing centers (see "Centralized Machine Tool Repair" in NARODNOYE KHOZYAYSTVO BELORUSSII, No 1, 1985). Specialization of this kind actually would help reduce the amount of repair and reduce repair expenditures. But this can only be a temporary measure, not a final solution to the problem. This is due first of all to the wary attitude of enterprises toward cooperative ties.



The Minsk tractor and automotive plants, GPZ-11, and the motor scooter plant are close to one another. However, they have not yet set up a cooperative repair service. Bureaucratic interests have prevailed in setting up production facilities as well. A repair service for all the enterprises of an industrial center, rayon or oblast must obviously be set up on a nondepartmental, interbranch basis.

On the other hand, updating machine tools in terms of technical level must be closer to new-equipment production facilities and thus be able to use all their equipment and technological innovations. But that is possible only when both the process of manufacturing new equipment and its major overhaul are subordinated to a single agency conducting technical policy in the branch.

It turns out to be most efficient to follow a principle of dual-subordination: branch and territorial. This is a form of production organization which has not been used in practice yet. Regional repair centers subordinated to the machine tool manufacturing ministry would best meet this requirement. The branch would be responsible for conducting a unified technical policy and for working out its future prospects. But questions of the type and amount of equipment to be repaired and of the suppliers and clients of the repair centers would be decided on by territorial administrative agencies. These might be, for example, councils of directors or other interbranch agencies at different levels.

It would be appropriate to create such centers where the metalworking equipment is most highly concentrated. Specialists think that would mean in the vicinity of Minsk and Vitebsk. For Minsk, we would need a plant able to do 10-12 million rubles worth of work a year, but in Vitebsk, it would be enough to open a branch facility.

Concentration in regional centers would permit a reduction in repair expenditures, reduced work volumes, and a corresponding reduction in the number of people needed to make the repair. The enterprise repair services could then be reoriented towards prompt preventive maintenance, which would have a considerable impact.

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DISCUSSION ON IN-HOUSE MACHINE BUILDING BY ENTERPRISES

Minsk NARODNOYE KHOZYAYSTVO BELORUSSII in Russian No 11, Nov 86 pp 5-8

[Article: "Updating Production, Improving the Shift Index"; first two paragraphs in boldface by NKhB]

[Text] You'd be hard put to find an enterprises that has not had to make a fitter's bench, a simple conveyor or fittings of some sort to meet its own needs at one time or another. That's always been true. But the latest buzzwords we are hearing more and more often lately are "in-house machine tool manufacturing" and "in-house machine building." The technical level of output for "internal" use must be improved qualitatively in the years just ahead. As was stated at the 3d Communist Party of Belorussia Central Committee Plenum, in machine building, "...one must proceed on the assumption that up to a third of the demand for machine tools and mechanisms will be met by manufacturing them in-house."

Naturally, this idea did not spring up spontaneously, but was prompted by the experience of the country's leading enterprises. When they have not limited themselves to semiprimitive "self-reliance" but have purposefully developed the production of equipment to meet their own needs, this has been of substantial help in accelerating enterprise retooling, in attaining the primary goal of producing modern output. We invited representatives of such enterprises to a roundtable to discuss this work, which is new to a majority of our managers. The following, all from Gomel, participated: Petr Leonidovich Kukharev, deputy chief engineer of the Gidroavtomatika production association; Iosif Moiseyevich Rabinovich, chief of the department of mechanization, automation and robotization at the Izmeritel production association; Yevgeniy Stefanovich Kurnevich, chief engineer at the machine tool manufacturing plant imeni S. M. Kirov; Yevgeniy Aleksandrovich Melnikov, chief of the Belorussian SSR Gosplan's subdepartment of machine tool manufacturing and automotive industry; and magazine correspondent V. Ponomarev.

What Can We Do Ourselves?

Correspondent: First, let's find out what we should include in in-house machine tool manufacturing.

P. Kukharev: Obviously, workbenches and fixtures don't belong in it. We

produce fixtures and nonstandard equipment to meet our own needs and market them as commodity output, that is, as if we had purchased them from ourselves. But in-house machine building should include, we gather from our ministry's clarifications, what we manufacture for "Glavgidromashnormal" [not further identified] enterprises, for example. We make 60 washers a year for the plants in our main administration, but we don't have the right to market them as commodity output, and supply them only on a contractual basis.

Ye. Malnikov: It is not only and not so much a matter of accounting subtleties. We are talking about special technological equipment that plays a considerable role in the production process. The corresponding methods worked out by the USSR Gosplan include in it mechanization and automation funds, machine tools, test rigs, and thermal, measuring, monitoring and other equipment.... "In-house" machine tool manufacturing is therefore essentially a conditional term suitable only for "colloquial" use. I repeat: the reference is to special technological equipment. For example, those washers, which are essential to the precision assembly of hydraulic parts.

Correspondent: Could anyone give an example of something "Gidroavtomatika" might need that couldn't be purchased outright?

P. Kukharev: Many. We may know, for example, that some particular plant has a machine tool we need, but we often can't even get the documentation for it because it's a prototype, a one-of-a-kind model which was made on the fly, cranked out and then no more were produced. This applies in particular to equipment for washing and flushing deburring scrap, which are essential.

The same is true of means of mechanization. Many enterprises have something worth copying, but the means of mechanization must be acquired anew each time. It wouldn't be a bad idea to produce them to meet branch needs, as we do with the washers. No, I'm not going off on a tangent. If the term "in-house machine building" is taken literally, meaning the equipment is only for one's own use, then I'm sure we are going down a dead end and will make the same mistake we did in manufacturing nonstandardized equipment. We've been talking about cooperation for several years now, but it hasn't taken off. Starting from scratch each time is an expensive proposition. If that is done, each "in-house" machine tool will essentially be experimental, crude and unreliable. Simply put, it will be primitive. The times demand a different approach.

In the final analysis, in-house machine building is not an end in itself, but only a means to high-quality basic output. It's no secret that machine-tool hydraulics have been a long-standing complaint among machine builders, so many Soviet machine tools must be equipped with imported systems. Thus, the Ivanovo Machine-Tool Manufacturing Associations equips its products with hydraulic systems made here, in Gomel. And as you know, their products are competing successfully in the world market. Some foreign companies are even looking to set up direct contacts with us....

We have achieved this success due largely to in-house equipment, to test rigs in particular. We began with very simple ones in which each subassembly was checked manually. We then began mechanizing and automating the rigs by

introducing electronics. Today, there are dozens of such rigs in the shops, so defects are caught. We want to continue development in this area.

Moreover, we've accumulated some experience in designing and manufacturing automated storage areas. Does it make sense to chase after yet another "rabbit," robots, for example? We don't have the ability to do that. You give us the robots, and we'll give you test rigs, storage units, washers....

We'll be introducing an automated technological complex over the next two years. The machine administration includes 15 NP machine tools, storage areas for fittings and blanks, and transport systems. Similar complexes are already operating at several plants, but not efficiently. If a robot malfunctions, its place is taken by a person; if an automatic sensor fails, it is replaced by an OTK [quality control department] inspector. In the final analysis, little remains of the concept. There is only one cause of these malfunctions: experimental devices in which the workmanship is poor. We, however, have "invested" our complex with verified, series-produced devices with consistent specifications. So we know that we'll be able to actualize the ideal principle of feeding in a blank and obtaining a finished product. We are confident that in-house machine building must also be set up on this improved basis. Otherwise, we'll be patching up holes all the time. Incidentally, we are having to make much of this complex -- the automated storage units, the transport and feed devices -- ourselves.

Moreover, we have a consumer goods sector where we manufacture hoods and fuel and oil filters for the Zhiguli. It uses only equipment produced in-house. Practically all the machine tools, of which there are dozens, are automatic. All the equipment was designed in our production mechanization design department and manufactured in the nonstandardized equipment sector in the repair shop.

Correspondent: Are these subdivisions able to cope with the amount of work still left to do this five-year plan?

P. Kukharev: No, of course not. The more so, since the enterprise renovation now underway anticipates even more significant automation of the warehousing and transport systems, once again, in-house. Let me add that the testing "computerization" I spoke about before will require a break with traditional thinking by the designer. Many of our specialists have been here for 20 years and are used to mechanical systems, and they are not prepared for such a decisive restructuring. So we will have quite a few personnel problems in the years ahead.

Correspondent: Weren't you perplexed by the directive to increase the proportion of in-house machine tool manufacturing to four percent of total commodity output?

P. Kukharev: Yes. Quite recently, our plans were anticipating increasing the work volume from 130,000 rubles this year to 200,000 rubles next year. We considered that substantial growth. Then it suddenly turned out that we were faced with increasing our production of machinery to meet our own needs to two million rubles a year, nearly a 20-fold increase! That gives us pause for



thought. First, we still don't know what products we'll be "recruiting" these two million rubles for. Second, a small sector isn't enough to do this; we'll need a large new shop. Think about the fact that ours is basically an assembly enterprise, that is, we produce output from assembly components. We don't have anything to produce even the simplest machine tool with, not to mention something like a complex gear. And what's a machine tool without gears?

I think the machine tool manufacturers should have it easier, in the sense of being able to modify slightly the design of a series-produced machine tool to adapt it to in-house needs...and thus cover the plan by several hundred thousand.

Ye. Kurnevich: That's not it at all. We are having exactly the same problem, although we've long since set up the production of machine tools to meet our own needs. We use modify series-produced models first, as that really is easier, but we also make special ones. Quite recently, for example, we manufactured seven pipe-benders to produce Zhiguli mufflers. We also have special (automated!) slotters and planers.

In recent years, we've begun producing machining centers. Six such centers are now in operation in our shops, helping resolve our production tasks. Along with accelerating retooling, this enables us to exercise what you might call author supervision of our output and to constantly improve it.

However, paradoxical as it may seem, the machining centers have complicated our meeting our assignments on developing in-house machine tool manufacturing. Why? Because it turns out that such centers machine beautifully 'all by themselves. They don't even need to be reset to meet in-house requirements: it's sufficient to adjust them. But then those machine tools are not counted towards in-house machine building....

At one time, we replaced a purchased off-the-shelf machine tool to manufacture umbrella ribs in the consumer goods sector with one of our own, a "home-made" machine. A clumsy, inefficient machine tool was replaced with a compact, economical, fast, cheap one. But in today's situation, we would have to think twice about taking such a step. I'm afraid it has made some plants inflate their in-house machine tool manufacturing figures to the detriment of simplicity and economy.

Four percent of our 65 million is more than 2.5 million in machine tool manufacturing output to meet our own needs. But after all, we are now moving from the machining centers towards flexible modules and FMS, whose potential is even greater. Such complexes will also be able to solve a majority of the plant's production problems, so we don't see the need yet to produce special equipment in this quantity.

In addition, the above-mentioned methods do not provide a precise explanation of what is a machine tool and what is a fitting, which is not counted as in-house machine building. A fitting may be complex and a machine tool may be simple. In the consumer goods sector, for example, we replaced cumbersome off-the-shelf presses with small, extremely simple presses we manufactured

ourselves. Machine tools or fittings? Count them or not? We don't even know ourselves.

Correspondent: Perhaps you could tell us the ruble value of the machine tools you're manufacturing now to meet your own needs?

Ye. Kurnevich: We haven't calculated that yet. Up until now, we have solved all our production problems successfully by our own efforts: we have a good KB [design bureau] and an adequate production base. After the plant renovation is complete, there are to be eight flexible manufacturing systems operating at the enterprise by the end of the five-year period. We will have to make some of the equipment ourselves. I'm confident we can do that. But it would be hard to say what percentage of total output that represents, what it amounts to in rubles. To be honest, we are also perplexed. We don't see any objective necessity for such a sharp increase -- several million rubles worth -- in output to meet our own needs.

I. Rabinovich: We're not that pessimistic at the Izmeritel. I'm sure the picture will be cleared up at our enterprises as well very soon.

In 1982, our ministry ordered that robot equipment complexes be introduced into production. The reference was essentially to in-house machine building. That very year, two complexes were planned for us; in 1983 -- 30; the following year -- 30.... We also wondered what we had gotten into, at first. The manipulator we received from the "Tekhnopribor" plant was nothing but an "arm." What was it supposed to be adapted to? And how? For a long time, I was one of the skeptics, too. I didn't believe it was feasible to use robots at our plant. And in fact, it turned out there was no necessity of doing so.

In those days, many plants installed robots "for the report," with little concern for their actual effectiveness. We took a different approach and went around to all the branch institutes and the enterprises with specialties similar to ours and studied their experience. Then we began making... building blocks which could be used to build any given structure, as in a child's erector set.

The parts are small in measuring-device machine building, and there was practically no special equipment for machining them available in this country. But now, you can see six robotized complexes in various stages of completion in the assembly sector. It is almost a conveyor. The first RTK [robot equipment complex] is already in the production adjustment stage, while the wiring has just been installed in the last. They are all equipped with the same manipulator, all have a unitized drive, identical control units and other systems. At the same time, all the RTK's are different -- they will be operated in different sectors and produce different items.

It took us eight months to make the first one, but now we can design and manufacture several different complexes in that same time. And we are using two or three robots in several of them. It turns out to be easier to make 20 machines than two. And that isn't paradoxical in any way: industrial, series production has taken over from pilot, semi-primitive production. The

developers of those manipulators visited us once and admitted that they hadn't envisioned for their robots the potential we endowed them with. That's what the module principle is all about!

A pneumohydraulic unit-type spindle head developed at the Izmeritel plant, for example, became one of those building blocks. Our designers even surpassed their colleagues at the specialized enterprise that produces the electric spindle head. Ours is cheaper, little more than one-third the size, simpler, more reliable, and has continuously variable control and other advantages. And you can add to that a spindle head and thread-cutting chuck of our own design, the power unit....

In brief, the order that initially caused us perplexity was an impetus to develop our own machine tool manufacturing base. The engineering staff was not increased. Rather, the designers were given a qualitatively new and more complex assignment. They coped with it and began enjoying it, and that had the effect of doubling and tripling their numbers. I think something of the sort will also occur if the development of in-house machine building is accelerated: we can't even guess the unexpected results this might lead to.

Correspondent: And what about the creative potential of the Izmeritel plant for operating to meet its own needs?

I. Rabinovich: There are a total of nine people in the mechanization and robotization department: six designers, two electricians and one machinist. Consider that this group is designing everything the plant will have to manufacture: test rigs, metal components...even the machinists' tables, the gates and benches....

And that's important. First, in the plant's shops which are already using RTK (about 50 of them), there's no longer any thought of working without them. The complexes stand almost one next to another and are operated in two or three shifts, saving time, space and manpower. This has relieved people who were skeptical about robotization. Second, the workers now trust that our designers are up to the task and often approach them with ideas of their own, sometimes quite unexpected and very valuable ones. We need only bring them to life in metal. Such cooperation is especially valuable right now, as the country's economic development is accelerating.

Incidentally, we are stimulating this more intensive work by our designers through a new salary system, also of our own design. Our designers work on rated assignments which stipulate additional payments for overfulfillment. Not 10 percent of their salaries, which really does little, but 20 percent. Now, each designer tries to put in 9-10 hours of "straight time" a day, rather than eight. Aware that he might be sent on a business trip or to do agricultural work, he tries to create a design "stockpile." I think this alone has increased the productivity of engineer's labor by about a third, and that's a considerable increase. During the two years the new system has been in effect, we have already tightened up the norms six times. But the designers keep on exceeding them.



Correspondent: As a consequence, the prospect of increasing in-house machine tool manufacturing several-fold doesn't frighten you?

I. Rabinovich: Our requirements are limited by our current level of knowledge. Tomorrow, we will know more and our requirements will increase. Just as in nature, you keep on walking, but the horizon doesn't get any closer. We have heretofore been concerned only with machining, but elsewhere, automatic machines are already being used to install electronic components on circuit boards, to automatically monitor parameters. That means we will be borrowing that experience. And then we will learn about something new....

This year, we are manufacturing 260,000 rubles worth of equipment to meet our own needs, but by the end of the five-year plan, we will be manufacturing more than four million rubles worth, and not only for ourselves, but for the branch as a whole. Of course, our six designers will not be able to cope with this. We have already determined the institutes whose developments we will be bringing to life in metal. I am therefore in full accord with Petr Leonidovich Kukharev that intrabrand cooperation and specialization are necessary. Incidentally, it is the watch-makers who have achieved the greatest success in production robotization, and precisely because such cooperation was set up 10 years ago now. There are numerous plants in our branch, for example, which lack both experienced designers and traditions. We must help them. Too little time has been spent on restructuring, but it is more important in this work than in any other to select the correct strategy, the correct technical policy.

But one thing is saddening. We do not conceal our experience: if people come to us, we teach them. We even held an oblast-wide seminar for specialists. It's been quite a while since then, but as far as I know, there's hardly been any movement anywhere on this. And our plant is not huge, by any means. Colleagues sometimes come here from larger enterprises, see what we are doing, are amazed, and...propose that we sell them a couple of complexes. But they lack the courage to resolve to get into manufacturing them themselves. So I'm glad that this work is being organized on a planned basis, as that will force many to get a move on.

Correspondent: But desire and enthusiasm alone will not solve the problem. One also needs production capacity, raw and other materials. After all, the Minstankoprom as a whole faces increasing its release of output to meet its own needs from 12 million this year to 330 million by the end of the five-year plan. That's nearly 30 times as much!

I. Rabinovich: Our department has a production sector with 20 workers. It's not enough. We have to engage in intraplant cooperation with the press, tool and billet shops and with the small-series sector. They provide us with blanks and do the turning, milling and grinding and are paid from our department's wage fund, to our mutual advantage.

Ye. Melnikov: There are quite a few other reserves as well. Each enterprise generally has repair shops and sectors. It is no secret that they are often operated inefficiently, in only one shift. That's a reserve. To an extent,



basic production equipment must also be used, which incidentally helps use it for two and three shifts.

The materials situation is more complicated, as their availability is severely limited. This forces the enterprises to be more responsible about saving metal and energy. For example, the rolled metal use factor is currently less than 0.5-0.6 at individual machine-building enterprises, and increasing it will provide them with an opportunity to produce additional output.

Correspondent: How do things stand today with in-house machine building in the republic as a whole?

Ye. Melnikov: We are studying the equipment requirements of the machine-building enterprises. It turns out that even those which manufacture their own output to meet branch needs will barely be at three percent by the end of the five-year plan. And, as Comrade N. N. Slyunkov said, machine builders will have to surpass the average indicator.

We have therefore prepared proposals on developing the process equipment manufacturing base to meet in-house needs of republic enterprises. It is assumed that our machine building will be at the 4.9 to five-percent level by the end of the five-year plan.

As concerns the methods mentioned above, they were developed in 1979 and should be refined. It is possible that above-plan series-produced output made by machine tool manufacturers to meet their own production needs will be viewed as "in-house" machine tool manufacturing. This will make it easier to meet the plan assignments.

Correspondent: We have now been set the task of replacing existing equipment only with progressive equipment an order of magnitude more sophisticated. Isn't there a danger that "home-made" machine tool manufacturing will turn out to be semiprimitive, at least in appearance? For example, even at the Hidroavtomatika, the test rigs look...unattractive, to be honest. And that enterprise is, after all, not exactly backward....

Ye. Melnikov: It is not our purpose yet to make this equipment competitive aesthetically or ergonomically. The main thing is that it perform its technological function. And if the primary Hidroavtomatika products were to reach the world market thanks to its test rigs, their modest outward appearance could be forgiven.

This five-year plan, there will be a sharp leap forward in the production of equipment to meet our own needs. And when that problem is basically solved, when people have sufficient experience, then we will be able to think about appearances.

Incidentally, in-house machine building can and must be set up on the most modern basis possible, right from the start. In fact, in a majority of cases, nothing needs to be acquired from outside. We need only circulate what is already being produced somewhere. This means we need to study experience and technical documentation and to make improvements. A true engineer

wouldn't agree to less. The task reduces to overcoming attitudes of passive expectation: give us the equipment and we will give you quality. The Gomel experience proves that this is within the means of practically any machine-building plant.

N.B.: the ministries are now dictating fewer and fewer terms to the enterprise. We only get control figures. All the rest depends on the resourcefulness, enterprise and efficiency of our specialists. The topic we've been discussing today is therefore by no means a private matter.

The high indicators set this five-year plan for technical level, competitiveness and production growth are forcing leaders to seek out every possible reserve. Until quite recently, we sometimes seized on some single management sector such as assets updating, quality, cost accounting, and so on. If a leader gave a good account of himself in terms of the most "fashionable" indicator, he was forgiven for lag in the others. Times are different now.

And it is not a matter of the manager's being equally demanding in all things at once. His own personal work must be different as well. Otherwise, you pull one leg out, while the other one gets stuck. You don't achieve acceleration on one leg. Acceleration and intensification mean simultaneous advance on all fronts.

Correspondent: Well, then, we wish you all such advancement. Thank you for participating in the conversation.

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CONSTRUCTION STATUS OF MACHINE BUILDING PLANTS VIEWED

Casting Project Abandoned in Tashkent

Moscow STROITELNAYA GAZETA in Russian 15 Oct 86 p 1

[Editorial by Sh. Zaynutdinov, Tashkent, entitled "Priority to the Objectives of Machine Building," subtitled "Contractual Obligation: The Dossier of Failure"]

[Text] This spring the Central Committee of the Uzbek Communist Party approved the initiative of an association of construction-installation, planning organizations and clients that had entered into a contract concerning the approaching deadline for implementing 1986 construction starts. Among the initiators of the action were the general contractor for special trust No 4 of the Uzbek SSR Minstroy [Ministry of Construction], subcontractor organizations of the republic's Minmontazhspetsstroy and the Uzgiprottyazhprom Institute [for planning of heavy industry], all of whom are participants in the reconstruction and broadening of the enterprise and client, PO Tashkent Tractor Factory imeni 50th anniversary of the USSR.

In the contract they resolved to provide the Tashkent Foundry with a steel casting production line 2 months ahead of schedule, on the anniversary of the Great October Revolution. The promised time is already near. Each of the signatories to the contract is dealing with increasingly difficult demands and their efforts seem to be in vain because of the basic equipment supplier, Ivano-Frankovsk PO "Karpatspressmash" of Minstankoprom [Ministry of the Machine Tools Industry].

It all started in 1983 when two automated lines for the production of casting molds arrived from Ivano-Frankovsk. Since then there has been no end to trying times for the client and subcontractors. The equipment is not complete, and during installation many defects were found. Managers of the Tashkent Tractor Factory turned to the Minstankoprom 52 times and complained to the Procurator of the USSR, the Committee for Native Control of the UkSSR, and Party and Soviet organs of the Ukrainian SSSR. All in all the dossier accumulated, and is now a cart load.

True, the installers recently attempted, after all this, to assemble a single line from the two and to run it in with idling mode. But this was not to be:

Because of factory defects, which then numbered more than 70, a breakdown occurred immediately.

All of this was presented at a routine meeting with the deputy minister for the Machine Tool and Instrument Industry of the USSR, N. Yendovitskiy. And what happened? The outcome was a promise to the Tashkent people that one of the lines would be abandoned at the end of December and the other in the second quarter of 1987. In other words, the association of builders, installers and tractor builders are doomed to failure in carrying out the state task of introducing casting production into the Tashkent Tractor Factory.

#### Success of Teamwork at Vladimir Tractor Factory

Moscow STROITELNAYA GAZETA in Russian 15 Oct 86 p 1

[Editorial by V. Lisakov, correspondent from the Minselkhozmash press agency, Vladimir, entitled "Priority to the Objectives of Machine Building," subtitled "Principles of Teamwork: Toward a Reliable Contract"]

[Text] First I will give two statements, two estimates of the status of reconstruction of the Vladimir Tractor Factory. Addressing the 27th CPSU Congress, the secretary of the party committee for the association Vladimir Tractor Factory imeni A.A. Zhdanov, V. Krasilshchikov, noted: "Reconstruction has only started, but already this year the established progress is significantly less than planned."

Four months later the director general of the association, A. Grishin, reported to colleagues of Minselkhozmash [Ministry of Agricultural Machine Building]: "In 6 months the builders have completed this year's quota and resolved to do another by year's end."

What kind of miracle happened? How did the collective of the Eighth Directorate of the Vladpromstroy [Vladimir Industrial Construction] trust of Minsevozstroy manage to accomplish such a sprint, completing 10 million rubles worth of construction and installation work?

At the party meeting, V. Krasilshchikov said that the collective of the association had created a new, very promising machine a year before the established deadline. It was necessary for the organization to renovate as quickly as possible in order to organize for its production.

Therefore, on the initiative of the party committees for the client and sub-contractors, the plans were revised for the building and installation work for this year, and a contract signed, consisting basically of mutual obligations of both associations.

Together with the already-existing production equipment, there is now an automatic casting section, and instrument and technical fitting shops. They were added in the summer, not at the end of the year, as noted earlier. And it appears that in addition to the organizational and material factors, the basic factor having a positive influence on the course of the reconstruction is psychological.



There is still no consumer, waiting while the "other side" fulfills its demand, but there is a joint search for optimal solutions. The association directed more than 1,700 thousand rubles of capital investments to developing the construction industry trust and building construction combine in Vladimir. Director general A. Grishin said, "The actual situation is such that without rapid renovation of the capabilities of subcontractor construction organizations we cannot accelerate the reconstruction of the enterprise. The yield from these expenditures will be quick and tangible, and permit a qualitatively new level of output in agricultural technology."

The same motives dictated the decision to transfer to the trust a 537-room dormitory, 10 stories of comfortable living quarters, as well as the constant allocation of workers to assist in the construction project, although the association itself is experiencing a labor shortage.

And what of the builders? They have to turn on a dime, so to speak, together with already-existing shops. Therefore, equipment selection is limited, and the delivery and storage of materials entails no small difficulty. In this complex situation the builders of the Eighth Directorate are now working under a collective subcontract and have shown character and professional workmanship.

"This initiative came from our best construction superintendent, brigade leader Aleksey Mikhailovich Drozdov," said the deputy director of the trust K. Regan. "He and his comrades took a contract for equipping the buildings with instruments and technological equipment (1,120 thousand rubles SMR). They took responsibility for the deadlines and quality of the work in the most important project, for discipline and for a zealous attitude toward resources. The brigade worked in two shifts. And although the collective is trying to use every minute, unfortunately, this is not always successful because of the absence of project and technical documentation."

Recently there was a forced pause in construction of the painting department. "Yes," admitted A. Grishin, "apparently the planners, namely, Giprotaktoroselkhoz mash [State Institute for Planning of the Tractor Industry and Agricultural Machinery Manufacture] still had not been inspired by the spirit of reconstruction. They issued documentation only after great delay."

Nevertheless, the attitude with which both collectives worked clearly shows the common interest in the final result.

One of the latter meetings of the bureau of the city committee of the party was held at the Vladimir Tractor Factory. The course of the reconstruction work was discussed by the party organization for the association in light of the requirements of the 27th CPSU Congress. And finally attention was centered on the actual problems of reconstruction. The conversation was objective and expressive, the causes of delay in individual areas were analyzed, and ways were noted for removing them. Communists of both associations supported the validity of the contract. The builders promised to fulfill still another plan by the end of the year and to deliver to the client all specified projects, and furthermore to stall the equipment in the new production areas and start it working.

Response to Criticism of 22 Aug 86 Issue

Moscow STROITELNAYA GAZETA in Russian 22 Oct 86 p 2

[Editorial: "Priority to the Objectives of Machine Building," under the rubric: "The Newspaper Presented It; What Was the Result?"; first paragraph in boldface in original]

[Text] On 22 Aug 86 under this headline our newspaper criticized the work of the trusts Kavsantekhmontazh [Caucasus Lathe Installers], Kavelektromontazh [Caucasus Electricity Installers] and Soyuzliftmontazh [All-Union Elevator Installers] on the construction of the engineering laboratory building of the Taganrog PKTI Kuzrobot [Kuznetz Robot Factory].

V. Demin, director of primary industries of the Regulating Directorate of USSR Minmontazhspetsstroy [Ministry for Installation of Special Equipment] contacted our editors to discuss the facts presented in the article, and a ministry representative was delegated to take action toward the objectives. As a result of this investigation, it was established that the named trusts had not fulfilled the plan for installations because of late allocation by the general contractor for construction preparation. Early in August the trust of No 1 Glavsevkavstroy [Main Northern Caucasus Construction] moved workers from the engineering laboratory building to the construction of other projects and at the present time work has not been renewed there.

The response to the items published in the editorial came from the client. The head of the main directorate for planning and major construction in the Ministry for the Lathe and Tool Industry, V. Sutyagin, told the editor that Minstankoprom [Ministry of the Lathe and Tool Industry] had reviewed the problems discussed in the article "Priority to Objectives of Machine Building."

A credit sanction, applied by the Stroybank [Construction Bank] in relation to the "Komsomolets" machine tool factory in Yegoryevsk was revoked in September. The factory can now put its own resources into the Stroybank to finance major construction in the fourth quarter.

Hydraulic drives and condenser tanks, needed for activating the production complex in the Nikolayev Experimental Factory for lubricating systems, have been installed. The subcontractor has also received an inadequate three units of nonstandardized equipment.

Equipment for six projects in the production complex of the Ruzayev Factory for automatic sheet stamping lines were sent to the trust of the Volgoneftekhemmuntazh [Volga Petroleum Equipment Installers] of Minmontazhspetsstroy of the USSR.

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MINSTANKOPROM SETS UPGRADED GUIDELINES FOR NEW TOOLS

Moscow SOVETSKAYA ROSSIYA in Russian 26 Nov 86 p 2

[Article by G. Podlesskikh, under the heading "Minstankoprom On the Eve of State Acceptance": "Standard Model"]

[Text] Jointly with the USSR State Committee for Standards, the collegium of the Ministry of Machine Tool and Tool Building Industry has reviewed the progress of branch enterprise preparations for state product acceptance. This topic of discussion is particularly important in this branch. The level of quality of the equipment being produced still does not meet the growing demand. Up to 70 percent of the output now being manufactured deviates from the standards. The number of marketing proscriptions and penalty fines has been increasing year by year. One-time punishments meted out occasionally cannot change the situation. It requires drastic, immediate measures which will force a sharp turn towards fundamental quality improvement.

We know that, as of 1 January of next year, state acceptance will be instituted at 115 branch enterprises. This will not be a bolt from the blue. The leaders know about it and have been preparing for it. But some plants have already been working under the new conditions for about a year. What of the results? They vary. In October, seven plants did release 75 percent or so of their output on first demand. Others, such as the Moscow Grinder Plant, were unsuccessful, even after five "calls." The result: all the plans were wrecked. And yet, not even a third of the basic output has thus far been submitted for state acceptance. What will happen when more is?

The leadership of the other enterprises must have been aware of the difficulties encountered by those first branch collectives to have gone through state acceptance of finished products. One would think they would have prepared more energetically for the new operating conditions, so as not to repeat another's bitter experience. But then another 57 branch enterprises were checked in October and November. Selective monitoring revealed an astonishing irresponsibility and lack of concern among many administrators. It turned out that design and technological documentation used in producing the output almost never accorded with the standards. Technical specifications were such conglomerations of parameters as to be practically unusable. The Belgorod Milling Machines Plant and the "Donpressmash" production association in Azov had no test beds for conducting the acceptance-release tests. Input



monitoring of assembly components for semifinished production and materials has not been set up at the Kropotkin Woodworking Machine Tools Plant, the Voronezh Heavy-Duty Mechanical Presses Plant, and elsewhere.

One is struck by the lack of production standards: filthy machine and assembly shops, parts being transported in bulk.... And everywhere, extremely inadequate metrological service. After all, can quality be tracked when the laboratories are crowded, humidity is high and the temperature fluctuates wildly? All this has a negative effect on the calibration devices. This situation exists at the "Komsomolets" machine-tool plant in Yegoryevsk, the Tomilinsk Diamond Tools Plant, and at many other plants. Production evenness is poor at a majority of the plants checked.

It would be impossible to enumerate all the substantial shortcomings revealed which will unavoidably shock the enterprise economies after state product acceptance is instituted. And this has seriously alarmed the branch headquarters. What main lines of effort should be stressed so that the situation can be corrected in the time remaining? This was the topic of discussion at a meeting of the collegium of the Minstankoprom and plant and association leaders. Branch headquarters was consulting with the commanders of its subunits.

"Operating with state product acceptance will require a new approach," said "Frezer" plant director V. Pashchenko. "It will first be necessary to use advanced technologies which significantly reduce the proportion of manual labor. However, state acceptance workers sometimes delay technical progress by demanding conformity to obsolete standards. We are therefore forced to use obsolete technological processes."

The experience of the collective at the "Frezer" plant shows that bringing technical documentation into line with standards, providing production with all the necessary modern metrological devices, and setting up input monitoring and scheduled preventive maintenance are of top-priority importance, especially for finishing equipment. At some enterprises, however, this work is only just beginning. For example, the Srednevolzhskiy Machine Tool Manufacturing Plant did not manage to complete it on schedule. It managed to have certified only 10 percent or less of its subassemblies, and those were the least complex. Many fittings and fixtures were found to require repair. In a word, there still exists a "sea of confusion," in the words of First Deputy Minister I. Ordinartsev, at many branch enterprises.

"Worker demands concerning production order, production organization and equipment availability, will increase sharply when state acceptance is instituted," emphasized A. Shibayev, quality control department chief at the Machine-Building Plant imeni Kirov.

Under cost accounting [khozyaystvennyy raschet], state acceptance rejects carelessness. The plan and quality become indissoluble. At the same time, one cannot seriously count on success with explanatory education in the labor collectives. The new economic mechanism provides considerable material advantages for the release of highest-quality products. At the same time, the stricter quality demands make every loose nut loss-producing: today's



deviations from technology will cost. By no means all workers have accustomed themselves to this procedure.

"The work must be set up in such a way that each worker feels himself personally responsible for the quality of the item being manufactured," says A. Baranauskas, general director of the Vilnius Machine-Tool Production Association. "We have thus far spent too little time in the shops, sectors and brigades and have been insufficiently concerned about educating people."

V. Rozhdestvenskiy, a Minstankoprom quality administration chief, spoke at length about the various forms of monitoring and reporting. For example, every person sent to the plants by the ministry will now be a kind of branch-headquarters authorized representative empowered to verify preparations to work under state-acceptance conditions. This administrative bent has met with disapproval among enterprise leaders. They are openly afraid that the numerous authorized agents and commissions and the paper blizzard of various applications will take up an unconscionable amount of time and detract from the job at hand.

Gosstandart deputy chairman I. Isayev, speaking about shortcomings in preparing to work under state product-acceptance conditions, gave the following examples. The party committee at a unitized machine tools plant summoned the principal state acceptance representative and told him straight out, "We are disappointed in you. Think about it!" Those at the Astrakhan Forge and Press Equipment Plant are in no hurry to assign people to work in state acceptance. Thirteen enterprises of the Minstankoprom have still not even submitted their output for state acceptance. Why not? Their products probably do not meet the standards and would have to be excluded from the reporting. Several plants plan on putting their technical documentation in order only in 1987. How will they be working beginning 1 January?

However, the administrators had quite a few questions and complaints of their own. A wave of protest swept through the hall after I. Isayev's statement that state acceptance will be conducted on only one shift. People were in disbelief at the unnecessary parallelism: state inspectorate agencies will continue their checks alongside the state acceptance workers. Until now, there has been no state verification or metrological certification of imported instrumentation. The enterprise leaders were also upset about what some state acceptance workers saw their role as being. They often place themselves above the collective and interfere in administrative activity through their directives. There were quite a few Gosstandart oversights in personnel selection also. There is very little time left before the state acceptance workers begin their task. But less than half the stipulated staff of state monitors is on hand, branch-wide. What guarantee is there that acquiescent, obedient people will be assigned, in haste, rather than principled, knowledgeable people?

"There have already been cases of workers being designated state monitors who have had several party fines levied against them in the space of a single year," notes "Frezer" plant director V. Pashchenko.

Still, the primary reliance has not been on mutual recriminations. We will, after all, have to work together to solve the tasks facing machine-tool manufacturers. Quite a bit of positive cooperation experience has already been accumulated. Many enterprises began the necessary preparations promptly. They have multipurpose brigades of specialists simulating state-acceptance conditions, and for some plants, the most difficult period is already behind them.

"Today, 90 percent of the output is being released to state acceptance agencies on first demand," says Yu. A. Kirillov, chief engineer at the "Krasnyy proletariy" machine-tool production association in Moscow. "Quite recently, though, that indicator was zero here. We are not content with this, however. Some of the machine tools had to be returned for additional work. We are paying more attention to the human factor: not all our trouble shooters are doing their jobs responsibly yet. Another problem was also revealed. The labor intensiveness of manufacturing a machine tool has risen by an average of eight hours. It is therefore necessary to resolve the question with additional wages. We also need nearly twice as many test stands as we now have.

The initial results are promising. Specific examples were given which convince us that we can prepare for state acceptance well and operate successfully. At the same time, bottlenecks and sore spots in the preparation stage were also clearly revealed in the course of the discussion. In summing up the results of the collegium meeting, First Deputy Minister I. Ordinartsev emphasized that we are faced with speeding up resolution of the problems and elimination of the shortcomings revealed, by taking more resolute and energetic action. Four weeks remain until state acceptance is instituted. Each day should be used to maximum effect so that we are not caught by surprise. The program of measures adopted at the collegium meeting orients us towards precisely this.

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RESTRUCTURING OF CREDIT, INVESTMENTS IN MACHINE BUILDING

Moscow DENG I KREDIT in Russian No 1, Jan 87 pp 7-16

[Article by I.V. Levchuk, USSR Gosbank board deputy chairman: "Restructuring Credit-Economic Work With Machine Building"]

[Text] The strategic task of accelerating the country's socio-economic development moves to the front lines intensification of social production in the machine-building industry, wherein fundamental scientific and technical concepts are materialized, wherein new implements of labor and machine systems which determine progress in other branches of the national economy are created. The CPSU Program, a new revision of which was approved by the 27th Party Congress, states that accelerating the pace of machine-building growth, is "the basis of scientific-technical progress in all branches of the national economy, the basis of maintaining the country's defense capability at the necessary level, and the mainline of future economic development."

In the course of working out the "Basic Directions of USSR Economic and Social Development for 1986-1990 and Up To 2000," the party Central Committee pointed out the danger of underestimating the leading role of machine building and the necessity of overcoming the previously noted trend towards even growth in it and industry as a whole. In an effort to restore the priority position of machine building in the national economy, we are faced in the 12th Five-Year Plan with developing this branch 90-percent faster than industry as a whole. A three- to four-fold reduction in the time involved in developing and mastering new equipment is anticipated, and new equipment must be at least 1.5 to two times more productive and reliable than that currently in production. Considerable capital investment is being allocated to developing machine building, and up to 50 percent of the funds will be directed into retooling production. Branch in-house production of special technical equipment to meet its own needs will be developed extensively. Complete-set deliveries and in-plant servicing of complex equipment will be developed.

The decisive step of switching machine building to an intensive path of development would be unthinkable without improving management and administrative methods. As M.S. Gorbachev has noted, resolution of "the new economic tasks will be impossible without thorough restructuring of the economic mechanism, without creating an integrated, effective, flexible management system which will permit better actualization of the potential of socialism" ("Materialy XXVII syezda Kommunisticheskoy partii Sovetskogo



Soyuza" [Materials of the 27th Congress of the Communist Party of the Soviet Union], Moscow, Politizdat, 1986, p 33).

The urgent necessity of improving the management system has been greatly underestimated until recently, and management has been restructured slowly and half-heartedly. Attachment to old and primarily administrative methods held the upper hand. After the April (1985) CPSU Central Committee Plenum, the situation in machine building began to change for the better, which has been greatly facilitated by an economic experiment. As of 1 January 1986, enterprises of all the machine-building ministries have been operating under new management conditions, and the results have been positive. A majority of the production associations and enterprises switched to the new methods of management have improved their performance of contract obligations and labor productivity growth and product quality assignments, and they have achieved product net cost savings. Methods are being worked out for enterprise and association operation under full cost-accounting and self-financing conditions.

The restructuring of the machine-building complex was reflected in the results for 1986. Labor productivity rose more in the first quarter than was anticipated by the plan and was higher than for industry as a whole. Far and away the greater part of the increment in normative net output was obtained through labor productivity growth. The maximum level of expenditures per ruble of commodity output was adhered to.

The USSR State Bank system has long-standing close ties with machine building. It generates about half the circulating capital for enterprises in this branch. By actively assisting the development of machine building and the introduction of new forms of management, the Gosbank has created the necessary initial conditions for switching enterprises to the economic experiment: loan sanctions were suspended, bank measures of influence were not used during the first half year, supplier loan repayment schedules were extended, and bank institutions were granted broader rights to make long-term loans. Loans to a number of ministries to make up for temporary shortfalls in their own circulating capital were rescheduled. All associations and enterprises were included in interbranch set-offs of mutual economic agency indebtedness, with loans being issued for up to 120 days to complete calculations. The acceleration of scientific-technical progress was stimulated. With a view towards exerting more economic influence on enterprise qualitative and quantitative performance, interest rates for the use of credit were differentiated as a function of how well these economic units meet plan assignments and use circulating capital efficiently.

The tasks set by the party demanded accelerated restructuring of banking and the creation of conditions "which would arouse enterprises and organizations to...use loans effectively, increase profitability, and settle accounts with the state promptly and in full," as was noted by N.I. Ryzhkov at the 27th Party Congress ("Materialy XXVII syezda Kommunisticheskoy partii Sovetskogo Soyuza," p 253).

The criticism of the financial-credit system made from the podium at the 27th CPSU Congress did much to stimulate the activeness of the State Bank,



especially its work with the machine-building branches, since it is precisely there that fundamental changes are occurring. In machine building, the restructuring began based on a statewide program for its development. A single agency was created to direct the machine-building complex.

Proceeding from the directives of the 27th CPSU Congress, the USSR Gosbank is now more demanding of ministries and enterprises with regard to the effectiveness with which credit is used and is taking steps to improve the leadership of Gosbank institutions, to increase the responsibility of the apparatus for proper organization of credit relations with machine-building enterprises, to reduce write-ups and report-writing. Instructions are being reviewed to bring them more into line with contemporary requirements.

The approach to providing credit for stocks of material goods resulting from disruptions in the normal production process was made more stringent in 1986. Credit is not granted for inventories accumulated due to failure to meet production plans in terms of production volume and product mix or for stocks used to produce substandard output. Significant above-normative stocks of finished products have accumulated in machine building in connection with failure to meet contracts as a result of uneven production, inadequate enterprise marketing orders, and also with the release of output in limited demand. The bank is not providing credit for them and requires the fastest possible marketing and release of only output that is needed.

This tightening of credit policy ensured a large increment in machine-building output with a smaller increment in credit investments in 1986. That signifies an acceleration in capital circulation, the more efficient use of capital, and greater machine-building production efficiency. Whereas the rate of increment in credit investments was 37.5 percent this past five-year plan, outstripping production development by 9.4 percentage points and an obvious sign of extensive development of credit relations, as of 1 October 1986, short-term loans had increased by 1.2 percent as compared with the corresponding date the year before, with significant growth in production volume. This positive trend must be strengthened and developed in every way possible, relying on increasing machine-building efficiency.

The banking system's successes in implementing the party policy of intensifying the influence of economic levers and incentives in order to strengthen autonomous financing and mobilize in-house reserves must not overshadow the problems still unsolved. Although insignificant, the increment in credit investment is covering the growth in commodity stocks. Given the task at hand, to ensure that the 1986 increment in industrial production occurs through reserves already available in the national economy, this testifies to the necessity of strengthening the bank's influence. Of 11 ministries, only one, the Minenergomash [Ministry of Power Machine Building], achieved the planned growth in production volume without increasing stocks of material goods.

The inadequate work of machine-building enterprises on reducing stock of material goods generated in connection with shortcomings in material-technical supply planning and organization and the production and marketing of finished products has not been properly evaluated by a number of Gosbank offices and

departments. Credit investment considerably in excess of the union average has been permitted for machine-building enterprises served by Gosbank institutions in the Armenian, Kirgiz and Uzbek republics, the increment in loans at the latter exceeding the unionwide level by more than 10 percentage points.

A mechanical approach to making loans, which is in violation of basic credit principles, promoted the credit investment growth in those republics. In many instances, loans were made with disregard for planned capital circulation requirements and without consideration of prompt and complete performance of plan assignments and marketing output in accord with contract obligations, which indicates poor economic work locally.

Raising the level of economic work is urgently necessary since significant shortcomings in economic-financial activity continue at machine-building enterprises. In the first half of 1986, a number of machine-building enterprises and associations failed to meet marketing volume plans and were considerably short in delivering contracted output. Associations and enterprises of the Minelektrotekhprom [Ministry of Electrical Equipment Industry], Minavtoprom [Ministry of Automotive Industry] and Mintyazhmash [Ministry of Tractor and Heavy Machine Building] accounted for the greatest shortfalls. Quite a few fines were paid by machine-building enterprises for failures to deliver products in the first half of 1986. The proportion of output in the highest quality category decreased. Manufacturing deviations from standards and specifications were permitted. During the first six months of 1986, deviations of this kind were discovered at many enterprises, in which connection a portion of the output was removed from plan fulfillment reports and a portion of the profit was transferred to the budget in the form of fines.

Enterprises of the machine-building complex are not yet working adequately to save raw and other materials, fuel and energy, exceeding quotas and contributing large sums to the state budget for failing to use these resources efficiently in 1985 and the first half of 1986. Considerable scarce material is being scrapped.

The inefficient use of wage funds has a negative effect on product net cost. During the first half of 1986, there were quite a few cases of wage fund overexpenditure, and their reimbursement worsened.

The financial results of associations and enterprises decreased due to poor product quality and products mix changes. Loss-generating production is being eliminated slowly, especially in the Minavtoprom and Minenergoprom [Ministry of Power and Electrification].

For machine building as a whole, nonproductive expenditures and losses due to mismanagement are considerable. Gosbank institutions must therefore be prompt in combatting nonproductive expenditures and more active in raising issues connected with ensuring that economic agencies operate without losses.

Many Gosbank offices and departments are still not paying proper attention to the efficient use and protection of circulating capital. Enterprises and associations are allowing their own circulating capital to be wasted by

failing to meet profit plans and by spending with disregard for the profit actually received.

Under these conditions, enterprises and associations of the machine-building complex are not taking necessary steps aimed at making up shortages of in-house circulating capital from their own sources or preventing waste in the future. In 1985, machine-building enterprises used profit from organizational-technical measures, but considerably less than called for in the assignments, to make up for shortfalls in in-house circulating capital. In the cases of a number of enterprises which did not carry out the measures developed to get that additional profit, the ministries again appealed to the USSR Gosbank for credit to make up temporary shortfalls in their own circulating capital.

In view of the fact that these shortfalls were a result of unsatisfactory economic-financial activity, and in view of the fact that the credit issued to make them up on a temporary basis does not have material support, the Gosbank offices and institutions need to be more exacting of the enterprises so as to increase their cost-accounting responsibility for preserving their own circulating capital and making up those funds, if wasted, from their own sources, including by saving resources and creating financial reserves. Such steps are now anticipated by the terms for transferring enterprises to the new management methods. Inasmuch as enterprises are currently making poor use of the opportunity for using a portion of their extra revenue from efficiency and product quality to create financial reserves, using them instead mainly for material incentives to workers, it is appropriate to confront enterprise leaders with the necessity of forming such reserves and monitoring the diversion of a portion of those reserves to make up shortfalls in their own circulating capital.

In conjunction with the accumulation of significant above-plan reserves of commodity-material values, shortcomings in the financial condition of machine-building enterprises lead to delays in settling accounts with suppliers and the bank. In spite of the steps taken, payment discipline continues to cause concern. As of 1 October 1986, the total due and payable indebtedness of the machine-building branches to the bank and to suppliers had increased appreciably in comparison with the same date in 1985, and the bulk of that indebtedness was accounted for by associations and enterprises of the Minelektrotekhprom, Minstankoprom [Ministry of Machine Tool and Tool Building Industry] and Minavtoprom. The payment discipline of machine-building enterprises and associations in Armenia, Georgia, Uzbekistan, the Ukraine and Kazakhstan worsened.

With a view towards increasing the responsibility of associations, enterprises and organizations for meeting contractual obligations, the CPSU Central Committee and USSR Council of Ministers Decree of 5 June 1986 "On Increasing the Responsibility of Associations, Enterprises and Organizations for Product and Commodity Delivery Contract Performance," along with other measures, doubles the fine for failure to pay promptly for products delivered, the payments to be made from the material incentives fund. The new rate is 0.08 percent of the total payment past due for each day over deadline, or 28.8 percent per annum.



This fine is very effective and will certainly help reduce the level of nonpayment and the number of defaults. Gosbank institutions should monitor compliance with this decree. At the same time, attention must be focused on providing enterprises with funds in strict accord with the principles of crediting and full autonomous financing.

Gosbank offices and institutions must increase the success rate of their work. Things must be set up so that bank credit relations with machine building facilitate the elimination of shortcomings in enterprise economic-financial activity and improvement in the use of enterprise and borrowed resources. In this regard, top-priority importance is assumed by issues of a differentiated approach to credit, by flexible response to shortcomings in enterprise activity, by the proper and consistent use of sanctions as a function of the status of enterprise economic-financial activity.

At present, credit sanctions are being used with a broad range of enterprises. In many instances, they prompt associations, enterprises and their superior agencies to take steps to eliminate the shortcomings and increase the effectiveness of machine-building production. At the same time, credit institutions have not yet outlived the practices of failing to analyze enterprise work results promptly, inconsistent use of economic sanctions, and unsubstantiated or less than a full range of sanctions. While perhaps withholding credit (completely or on special terms), a number of Gosbank institution leaders forget about the necessity of a state-oriented approach to solving credit problems, give in to local interests and issue payment credits. In a number of cases, enterprises operating poorly and not meeting their obligations to the state or other economic agencies have funds in their accounts and spend money they haven't earned on wages and bonuses. Sanctions are sometimes imposed formally, for minor mistakes, which reduces their effectiveness and results in their being in effect for long periods. This banking practice should be resolutely eliminated.

Resolution of the tasks machine building faces in accelerating technical progress would be inconceivable without stimulating the work of the scientific research institutions, without seeking out and using new forms of interaction between science and production. About half of the scientific-research, planning-design and technological organizations in machine building have been switched to calculations based on completely finished work, which will doubtless have an impact on the development of loans for unfinished production in these organizations, and these currently total an indebtedness of about 150 million rubles.

There are still quite a few shortcomings and examples of ineffective work on and poor development of topics involving the creation of new products and new technological processes in the work of branch scientific organizations. In order to strengthen the influence of credit on the effectiveness of scientific organizations, it must only be extended for unfinished production that involves topics whose outcome will be the development of new types of products and new technological processes.



A large role is being given to the machine-building complex in implementing the "Comprehensive Program for Developing Consumer Goods Production and the Services Sphere in 1986-1990."

It should be recognized that the potential for bank influence on enterprise and association implementation of set assignments for producing high-quality consumer goods is not being used fully. In the first half of 1986, associations and enterprises of the Minstankoprom, Minstroydormash [Ministry of Construction, Road and Municipal Machine Building] and Minlegpishchemash [Ministry of Machine Building for Light and Food Industry and Household Appliances] failed to meet plan assignments for releasing items in the highest quality category, and the shortfall was considerable in monetary terms. Due to the fact that the quality and technical level of many consumer goods do not meet the requirements of the populace, and left-over finished products, whose production involves the expenditure of considerable labor, material and financial resources, are increasing at enterprise warehouses. Gosbank workers should cooperate more actively with the collectives at machine-building enterprises, assisting them, when necessary, with credit to create and re-equip shops to produce consumer goods or to try to increase the production of needed goods.

Work is still developing slowly on attracting the enterprises and associations of the machine-building ministries to meeting popular demand for fee services. In the first half of 1986, a whole series of enterprises failed to carry out plan assignments on fee services. In branches of the machine-building complex, the bulk of the fee services is accounted for by traditional types such as housing and municipal services and supporting children's and preschool institutions, but the proportion of personal services facilitating the creation of additional conveniences for the populace, reducing losses of working time or meeting the effective demand better is insignificant. Many enterprises are not involved in this important work at all.

In view of the serious shortcomings in developing the services sphere and the role of local supervisory agencies in solving this problem -- their required approval of plans for offering specific types of services, Gosbank institutions are obligated to participate more actively in the development of proposals for better meeting the effective demand and in submitting them for review by directive agencies, to make greater use of the right granted them to issue credit for the construction, expansion and retooling of facilities providing fee services to the populace. In accordance with party and government resolutions, increasing efforts are being made to create subsidiary farms at enterprises and associations. Unfortunately, the current situation with regard to subsidiary farms at machine-building enterprises does not yet fully meet the demand for effective expenditure of material, labor and financial resources; production outlays are still high on many such farms.

Bank participation in improving the operation of subsidiary farms is expressed in its issuing credit for the acquisition of young livestock and feed and to meet other animal husbandry and plant cultivation expenses. At the same time, the necessary attention is not being paid to the material-technical base of subsidiary farms, to increasing their economic effectiveness. The tasks dictated by the Food Program and the necessity of expending credit resources

economically insistently demand changing over to economically substantiated investments of funds in the development of subsidiary farms so as to ensure the introduction of intensive agricultural production technology. Labor, material and financial resources must not be permitted to be scattered among farms yielding low agricultural output with increasing production outlays.

The state of affairs in machine building testifies to the fact that switching enterprises over to the new management methods still does not fully respond to the task put forward by the 27th CPSU Congress, that of intensifying social production. The new management methods are only a stage en route to the creative use of economic levers and incentives, to creating true cost accounting, to changing enterprises over to self-financing.

Without weakening the centralized principle in conducting a unified state financial-credit policy, we are faced with creating conditions for the comprehensive development of the initiative and resourcefulness of labor collectives, intensifying their interest in increasing monetary accumulations, and increasing responsibility for the financial end results of enterprise and association cost-accounting activity. In this regard, everything useful and valuable which has been accumulated under the new management conditions in the machine-building branches and in the activity of the AvtoVAZ [Volga Automotive Plant production association] and Sumi Machine-Building Scientific-Production Association imeni M.V. Frunze, which are operating under self-financing conditions, will be taken into consideration.

The party views just such a consistent changeover of enterprises and associations to full cost accounting, with a greater role for commodity-monetary relations in accordance with the new content inherent to them under socialism, as being the primary direction in restructuring the economic mechanism.

In order to create the best economic conditions for using the resources available to the enterprises, at a minimum we need to ensure that each enterprise pays its own way. One cannot be reconciled to the fact that many enterprises continue to operate at a loss and allow their own circulating capital to be wasted. Such enterprises are supported either with the profit from economic agencies which are operating well or from state resources. In this connection, the bank apparatus should be actively engaged in studying the causes of enterprise and association losses and in doing everything possible to facilitate the use of effective economic incentives to improve their stock of equipment and the structure of the output they produce, to refine ties involving production and delivery specialization and cooperation ties. It may even be necessary to re-examine the issue of making enterprises operating at a loss subordinate to highly profitable associations or reorganizing subdivisions (shops) in them.

The changeover to association self-financing signifies fuller implementation of autonomous-financing principles. The idea is that all expenditures on the technical development and improvement of production, on the entire complex of social and cultural measures to benefit the labor collectives and material incentives, must be made using funds earned by the labor collectives. This in no way excludes the possibility of enterprises' enlisting bank credit and

subsequent repayment using their own financial resources. To the contrary, labor collective opportunities to do so are being broadened considerably, but timely repayment must be ensured unconditionally. Under self-financing conditions, enterprises obtain real rights in choosing the optimum directions for using their own financial resources.

As the fundamental principles of full cost accounting, paying one's own way and self-financing enable each enterprise to set up its own activity in accordance with the assignments of the national economic plan and, given efficient management, not only to ensure reimbursement of expenditures of producing and marketing output and using funds they earn to finance their own production improvements, material incentives and social development of their labor collectives, but also to participate actively, using the monetary accumulations obtained, in meeting national needs and unswervingly meeting their obligations to the state.

The experience of the Sumi Machine-Building Scientific-Production Association imeni M.V. Frunze shows that the growth rate of basic work indicators achieved in 1985 and the first half of 1986 significantly surpassed the average annual growth during the first four years of this past five-year plan.

Last year, a decision was made to switch the following to full autonomous financing beginning in 1987: USSR Ministry of Chemical and Petroleum Machine Building, USSR Ministry of Instrument Building, Automation Equipment and Control Systems, USSR Ministry of Automotive Industry, and a number of enterprises and associations of other machine-building ministries.

An economic mechanism structured on principles of full autonomous financing anticipates changes in the principles under which the associations and enterprises of the machine-building ministries are presently operating. The primary change is in the approach to evaluating enterprise activity. Amount of profit is approved in the five-year and annual plans as the financial end result of production activity. This broadens the initiative of the enterprises and orients labor collectives towards attaining good end results.

The essence of the normatives has been changed. As we know, under the new management conditions, incentives are provided for indicator increment. Under full autonomous financing, the normatives of deductions to economic incentives funds are set in percentages of profit remaining for enterprise use, and the normative of deductions from profit to state and local budgets are stable, but increase progressively for each year of the five-year plan. Deductions to the centralized production development fund and the science and technology fund and ministry reserves are also stable and normative in nature.

The rights of economic agencies to use economic incentives funds have been broadened. Thus, the areas in which social, cultural and housing construction funds are used are determined independently by the labor collective. In this regard, it is recommended that at least 50 percent of these funds be spent on the construction of housing, children's preschool institutions, public health facilities, social and cultural facilities. Moreover, associations and enterprises are permitted to transfer these funds to local Soviets and other organizations and enterprises for the construction of nonproduction



facilities, and first of all housing, independently and on a proportionate-participation basis, with the consent of the labor collectives.

This broadening of the rights of labor collectives to spend economic incentives funds is being combined with increased responsibility for the fullest use of existing capacities and technical improvements in fixed assets. The only source of financing for that is enterprise or borrowed funds; budget allocations are not anticipated.

The introduction of full autonomous financing at machine-building enterprises is being combined with an increased role for the bank as the most important agency for economic control. In this connection, the idea is to change over to making loans for the aggregate of stocks and production expenditures and to drawing up annual credit plans.

This credit method has been approved at a number of enterprises in machine building and other branches of the national economy. The results of an experiment conducted in this area confirmed the possibility and appropriateness of singling out quota-based circulating capital as the sole basis for issuing credit. Institution of the normative of maximum level of commodity-material stocks per ruble of output marketed enables us to raise the level and improve the success rate of monitoring to prevent the use of credit to cover above-plan stocks of commodity-material goods at the planning stage. To this end, Gosbank institutions must verify that the planned total stocks of commodity-material goods does not include physically existing left-over, surplus, unused and other material goods which are not acceptable for crediting by the bank.

The consolidation of credit-basis capital reduces the number of loan accounts per enterprises by 2-3 (and by up to seven in some instances), considerably facilitating the work of the economic and accounting apparatus in bank institutions and at enterprises. It becomes possible to raise the economic level of credit workers.

Broadening the rights of Gosbank institutions to differentiate credit relations will activate the influence of bank credit on the economic-financial activity of machine-building enterprises. The Gosbank is granted the rights to impose sanctions in the form of a 50-percent increase in the interest rates on loans, to stop making new loans and to call for early repayment of loans already made to economic agencies not carrying out product marketing plans in accordance with agreements in force or not meeting profit plans, to enterprises permitting growth in above-quota stocks of commodity-material goods, and to enterprises using their own circulating capital inefficiently and failing to settle accounts with suppliers and banks promptly. Enterprises operating well must be stimulated by lowering interest rates, with credit ratings being checked once each quarter.

With this improvement in the financial-credit mechanism of the machine-building complex, restructuring the work style and methods of local Gosbank institutions and offices, which actually make the loans to the associations and enterprises, takes on exceptionally important significance. Each bank collective must work in an atmosphere of inquiry, updating its own methods and



helping introduce the new forms of management as quickly as possible. We need to achieve a situation in which each bank specialist working with enterprises of the machine-building complex knows to perfection the economic mechanism built on principles of self-financing and paying one's own way, on principles of full autonomous financing.

It was noted at the Sixth Session of the 11th Convocation of the USSR Supreme Soviet in November 1986 that particular attention must be paid to resolving the task of fundamentally raising the technical level of output in production, and foremost in machine building. The proportion of basic output at the world level is being increased by 60 percent in the machine-building ministries. In subsequent years, the proportion of such output will grow in such a way that the task set by the June (1986) CPSU Central Committee Plenum will be resolved by the end of the five-year plan.

Time has pushed machine building to the forefront of the economic, scientific and technical restructuring, and workers of the most important agency of economic management, the USSR State Bank, must ensure prompt, competent resolution of the issues on which the effectiveness of the new forms of management depends.

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